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T. A. RICKARD . . . . . EDITOR
FREDERICK HOBART, SAMUEL SANFORD, D. H. NEWLAND . . . . ASSOCIATE EDITORS

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EDITORIAL.

SUBSCRIBERS TO THE JOURNAL should have received their copies of the Index to Volume LXXVII, with the number for August 4. Those who have not received it will oblige us by notifying this office. Subscribers will note a change in the form of the index, consisting in its division into two parts. The first contains references to the articles published in the course of the six months, while the second part contains separately all the references to what may be called the news matter; that is, the mining news, personals, markets and other departments. This division appeared to the editors to be necessary on account of the great bulk which the Index has now reached, and the very large number of references. We think it will be a convenience to readers.

IN OUR LAST issue we published a letter from Mr. B. B. Lawrence, referring to the fund which is being raised for the relief of the families of the non-union workmen who were killed by the explosion at Independence, in the Cripple Creek district, in Colorado, last June, and for those injured as the result of the explosion. Mr. Lawrence emphasized his opinions by sending us a substantial check, which has been forwarded to the proper quarter. Doubtless there are others of our readers who would like to contribute to this excellent object. These we would refer to Mr. Lawrence's letter, as to the committee at Cripple Creek in charge of the matter, and we trust that the fund thus being raised will be sufficient for its very worthy object.

THE APPARENTLY endless dispute between the Anti-Debris men and the hydraulic and drift miners, in California, has recently developed, as we mentioned in the JOURNAL, into an attempt to place upon the miners the responsibility for flood damages resulting from last season's overflows in the rivers. We have already mentioned the steps taken by the Anti-Debris Association at the recent meeting of the California River Improvement Association. Both sides, however, were represented in that convention, and the Association decided to select three engineers from outside of California, and therefore presumably unprejudiced, to study the conditions and make a report. The Board

of Public Works of the State accepted this suggestion, and selected Major H. N. Chittenden, H. B. Richardson and Major F. C. Dabney. These gentlemen have accepted the appointment, and will make a report on the improvement of the rivers, control of the flood waters, and incidentally on the effect of mining operations on the river conditions. While we may expect a valuable and disinterested report in the matter in the course of the next year, it is, after all, probable that the final decision in the question will rest with the United States engineers.

IN ANOTHER column a correspondent discusses the proposal to amend the mining law from a Mexican point of view. That is, he takes the Mexican law as a basis for future legislation, and shows what can be done under its provisions. Quite probably, many mining men will not be ready for such radical changes as would be involved. The subject is of such importance, however, that it is well to discuss it from all points of view, and we hope that many of our readers may be moved to express their opinions.

THE PROJECTED consolidation of the lead manufacturing companies has been delayed by certain differences of opinion, which, however, are not so serious as to be incapable of reconciliation. It is considered in the trade that the deal will in all likelihood eventually go through, since it is cheaper for two such rival interests to work together than to fight. The United Lead Company needs the trade connections of the National Lead Company, and the latter can avail itself advantageously of the resources and affiliations of the former, while the establishment of a close community of interest with the American Smelting & Refining Company will tend to produce an eminently satisfactory state of affairs to all concerned—in selling, at least.

THE QUICKSILVER district of Brewster county in Texas—the only important source of this metal outside of California—has had its boundaries considerably enlarged by new discoveries, as described on another page. It seems probable, also, that still further extensions may be made. These finds are of importance, as the world's supply of quicksilver has been stationary for some time past. In fact, it has retrograded a little, and it has been a long time since new quicksilver deposits have been discovered. There is a prospect of early development of the new mines.

THE REPORT of the Calumet & Hecla Mining Company, which has just been published, is a disappointing document, as usual. The entire absence of any detailed information as to one of the great copper mines of the world is disappointing. We have frequently commented on the policy of concealment adopted by this company, and further reference to it may seem superfluous; but it is a subject which ought not to be allowed to rest. The company owes its stockholders and the mining world a fair statement, and the managers should be continually reminded of their duty.

THE RESPONSIBILITY OF DIRECTORS.

The last issue of that useful annual 'The Directory of Directors' exhibits the fact that the maximum activity in this branch of company organization in London is attributed to Mr. C. Rube, who is on the board of 43 companies, all of them South African. Next comes Mr. Edmund Davis, with 34 directorships, and then the late Mr. Percy Tarbutt, who is director of 27 companies. But even this prolific scattering of business acumen and personal responsibility is exceeded in New York, where Mr. Chauncey Depew, not content with his duties as Senator, and all that therein lies, serves on 74 directorates; Mr. W. H. Newman is on 60 boards, while W. K. Vanderbilt is 55 times a director.

The enumeration just given will appear grotesquely humorous at first sight to those who find one position, one responsibility and one duty sufficient to absorb all their time and energy. In any event, even allowing for the diversified engagements of men of big affairs, it is obvious that the sense of personal responsibility and trusteeship is laughed out of countenance by the performance of gentlemen who are on the management of fifty or more companies.

In 1903 no less than 1,629 companies in England became insolvent, involving a loss on capital of $311,456,000 and an actual loss of public subscriptions amounting to $145,995,000. What the loss in joint-stock companies in the United States may have been during the same year, no one has computed, but the Consolidated Lake Superior, the United States Shipbuilding, the American Bicycle, the White Mountain Paper and the International Fire Engine companies, make up an aggregate loss of about $250,000,000, so that these five fiascos go a long way toward equalling the total British loss, and every one knows that this $250,000,000 does not represent one-half the total sums that have fizzled into thin air during the last twelve months on this side of the Atlantic, which, by shipbuilding and marine flotations, served as a link between New York and London in a manner far from sentimental.

The reckless scattering of responsibility and the woeful loss of capital invested, are contrasted so that they tell their own moral. Of course we are aware that by the system of 'alternates' South African mining companies carry a double directorate, and this fact will make it patent that the maximum of Mr. Rube is really only about twenty-or twenty-five, as against Mr. Depew's seventy directorships. But whether it be the twenty or seventy, it is obvious that the whole system of company control is rendered as irresponsible as it is absurd, and the sooner the public exacts a more serious regard for duty from those who serve as trustees, the sooner will industrial and mining undertakings be relieved from this farcical condition of affairs.

IRON MAKING IN THE LAKE SUPERIOR REGION.

The question of the best situation for blast furnaces, which has been often discussed from different points of view, has, for the most part, found a practical solution in this country by the placing of the furnaces within convenient distance of the fuel supply. In other words, it has been found more economical to carry the ore to the fuel than the fuel to the ore. Many attempts have been made in the past to establish blast furnaces in the Lake Superior country to carry out the opposite view, but, with very few exceptions, they have not been successful; and those exceptions have been mainly charcoal furnaces of moderate size, the fuel for which was derived from the forests of the Upper Peninsula of Michigan. There was reason for this. Coke, which is the staple blast furnace fuel of this country, will not stand the frequent handling necessary to forward it to the Lake Superior country by rail and lake, while the all-rail freight charges are too high to permit of its use in smelting with a profit.

A new departure, however, has been made by the Zenith Furnace Company, of Duluth, which has just completed an extensive plant at that city, and which proposes to run a blast furnace there, believing that a profit can be secured in the manufacture of iron from Mesabi ores at that point. The plant, which is described fully in another column, differs in some important respects from all the previous undertakings of the kind. The company will not attempt to transport coke from Pennsylvania to Minnesota, but will carry the raw coal and convert it into coke in the immediate neighborhood of its furnace, relying upon the profits to be derived from the various by-products to pay in large part, if not altogether, the expenses of the transportation. Among the most important of these by-products will be the gas from the retort coke ovens, for the sale of which a contract has been made with the neighboring cities of Duluth and Superior.

The plans appear to have been well worked out, and the plant well designed for the purpose. It is certainly a most interesting experiment, not only on account of the locality, but because it is one of the first blast-furnace plants in this country where the by-products are to play an important part. There are already a few furnace plants which make their own coke, but that is not at present the general practice, the custom being to buy coke from the ovens and transport it to the point where it is to be used in that form. In more than one respect,

therefore, the Zenith Furnace Company deserves credit for its enterprise, and in some points it may serve as an example to other companies. The outcome of the experiment will be watched with interest, and we certainly wish the new plant all success.

THE COPPER POSITION.

Owing to the policy of secrecy adopted by some of the leading companies, to which we have heretofore referred in the JOURNAL, it is a somewhat difficult matter to follow the movement of copper in a way which would be satisfactory to the needs of the trade. The object of the secrecy on the part of those companies is generally understood. The policy, we have always believed, is altogether a mistaken one, and it would be to the benefit of the companies themselves, as well as to the trade, if production statistics could be obtained as readily as formerly, when the reports were made to the Producers' Association.

While the actual position of copper is therefore, to some extent, a matter of conjecture, nevertheless there are sources from which figures can be obtained, giving an approximation to the true position. Using such information as is attainable, we have, therefore, prepared the following table showing imports, exports and approximate consumption for the first half of the current year:

	Tons
Stocks, January 1	75,407
Production, six months	161,680
Net imports	38,950
Total supply	276,037
Exports	117,024
Approximate consumption	84,820
Total deductions	201,844
Stocks July 1	74,193

The stocks given on January 1 are those which were worked out by the JOURNAL and published in its issue of January 7. The figures in the table are in long tons of 2,240 lb. The net imports given above are the fine copper and the copper contents of the copper matte and ores imported, after deducting the re-exports of foreign material. The exports are those given by the Bureau of Statistics of the Department of Commerce and Labor.

The production for the first half of the current year shows an increase of about 8 per cent, and this we believe to be a rather conservative statement. It is true that the output in Montana has been at least stationary, but in Arizona there has been a very considerable increase, coming partly from the improved condition of the United Verde, partly from the new mines in the Bisbee district, and partly from other new mines which are this year coming into the list of producers for the first time. In the Lake Superior country there has been a large increase, chiefly from the new South Range mines, and in other districts production has been either stationary, or has shown a moderate increase.

The most difficult point to ascertain is the actual consumption. There is no doubt that this has fallen off very considerably. In the first half of 1903 the best authorities on this point estimated our actual consumption of copper at about 45,000,000 lb. a month. The current year has shown more or less depression in all the industries into which copper enters as an important factor, and there is little doubt that the total use of the metal is not much over two-thirds of the quantity which was last year going into manufacturing plants.

Under these circumstances, there would have been a surplus of the metal and a large increase in the floating stocks, had it not been for the great increase in the foreign demand. Exports this year have been nearly double those of the first half of 1903, and the purchases by Great Britain and Germany, especially the last-named country, have been very large. Moreover, there is evidence that the metal so taken has not been bought for storage or for speculative purposes, but has entered almost immediately into consumption. Business has been better, money more abundant and new enterprises consequently more numerous than for several years past. The quantity of electrical work which has been undertaken, and into which copper necessarily enters, has been very large. At the present time there is a check in this activity, owing to political complications; whether it will last for more than a few months remains to be seen. Possibly it will induce some slackening in the exports of copper for a time, but we believe that our foreign sales will still be considerable for the remainder of the year.

The statement above given, which we believe at least approximately correct, shows that the stocks of copper in this country are, as they were at the beginning of the year, at about the normal level; that is, they do not exceed the quantity of copper which is necessarily always on hand in transit, in process of refining, and the like. We are unable to find that there is any considerable accumulation of the metal in sellers' or producers' hands, and on this point the outlook for the trade is certainly a favorable one.

MARKET CONDITIONS.

Aug. 10.

The metal markets have been very quiet, not to say dull, during the week. The vacation season is fully on now, and no one seems to be doing any more business than is absolutely necessary.

Copper is quiet, domestic consumers taking little interest in the market, and being apparently satisfied with such small purchases as cover their immediate needs. Abroad, the effect of the political complications is still felt, and purchasers are holding back, apparently to see what the future may bring forth.

Tin shows no material change, but spot metal is in a little better supply from recent arrivals. In lead there is no change in demand or prices, although business is limited to current requirements, as in the other metals. Spelter is also dull, but unchanged. In the Joplin zinc district production is restricted by recent floods and excess of rain, which have obliged some mines to stop. Notwithstanding this, the zinc ore market shows a tendency to lower prices.

The silver market remains steady, with only very slight changes in price, the demand from the East continuing to be very good.

In the iron and steel markets business is a little better in some lines, but in others there is a tendency to fall off. Buying of pig iron has been somewhat better, and the decline in prices seems to have stopped for the present. On the other hand, the steel billet market is uncertain, and some large transactions have been reported on a conversion basis, which will work out at a price considerably below that fixed by the Billet Association. In finished material most of the current business is being taken by independent concerns, but the amount of shading done to secure this business is uncertain. The only favorable indication in the trade is an apparent willingness on the part of buyers to make contracts further ahead than they have been doing for some time past.

The Western coal trade is quiet, local demand for coal for manufacturing purposes being moderate only. In the lake trade shipments are somewhat lighter than last year.

The anthracite coal trade is in a state of midsummer dullness, but most of the collieries that were closed last week have resumed work; it is likely that production will be restricted in one way or another for some time.

The seaboard bituminous market is still very quiet, and little immediate improvement is looked for.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

British coal is now shipped to Jerusalem, being delivered by vessel at the port of Jaffa and carried from there to the Holy City by rail. Some business is also done to other parts of the country, coal being carried by camels. The cost of freight by rail from Jaffa to Jerusalem, 54 miles, is $3.50 per ton.

Sweden possesses a small coal-field which is situated in Scania, the most southerly province of the kingdom. The coal occurs in rocks of Jurassic age interstratified with seams of fire clay, and the two minerals are mined together. The output of coal in 1902 was 304,733 metric tons.

Notwithstanding the large production of petroleum in Russia, the use of illuminating oil in the country is small. It has been limited by a tax of 60 kopeks per pood on refined oil. Recently the Baku refiners have petitioned the government to abolish this tax on refined oil for home consumption, and to substitute for it a tax of 5 kopeks per pood on all crude oil produced. It is thought that the petition will be granted.

In the Simon-Carves coke oven, in use in the North of England, the gases are drawn off to the washing plant where the coal, tar, ammonia and benzole are washed out and settled, and the gas is returned to the bottom flue of the oven to be burned there to supply the necessary heat for coking. There is usually a surplus of about 35 per cent of the gas, which is not required for the ovens, and which can be used under boilers for producing steam, or directly through the gas engine for the production of power.

Deposits of natural soda are found in arid regions in many parts of the world. They owe their formation to the drying up of lakes, the waters of which gradually become concentrated through the long-continued processes of influx and evaporation. In the Libyan Desert, 40 miles northwest of Cairo, there is a series of small lakes, all of which are strongly alkaline, and have deposited great quantities of soda on the shores and beds. The soda is extracted in the summer season when the waters are lowered by evaporation.

A new electric furnace method has been invented by a Frenchman, Mr. A. Nodon. The electro-negative metal is fused and used as the cathode in an electric furnace with a non-attackable substance as anode and an electrolyte of a fusible, only slightly volatile, halogen compound of the more electro-positive metal. When a current is passed through, the ionization effected produces a combination of the metals, with liberation of the halogen. Other metals can be incorporated, the precautions necessary, and the factors controlling the proportions required, being described.

Fluorspar, which is mined extensively in Kentucky and Illinois, is used for various purposes. The highest grade material containing less than one per cent silica is employed for the manufacture of chemical products, enamels and glass. The second quality of spar with not more than four per cent silica is used as a flux in steel making, principally for open-hearth work. The lowest grade, including all material that contains more than four per cent silica, is consumed for foundry purposes. Fluorspar is a much more efficient flux than limestone, and its employment in the iron and steel industries is rapidly expanding.

EXTENSION OF THE QUICKSILVER DISTRICT IN BREWSTER COUNTY, TEXAS.

By Wm. B. Phillips.*

Last March I had the honor to announce in this JOURNAL the extension of the quicksilver field in Brewster county, Texas, which centers around Terlingua, to the southeast of the Chisos mountains. A recent discovery has extended the limits of the district 20 miles to the northeast, to Big Christmas mountain, and somewhat beyond. As usual, the find was made by Mexicans. It is in Block G4, north and northeast of Christmas Spring, which is in Section 98. The exact location of the new find has not yet been determined, but as this portion of Block G4 is equally divided between the public school fund and the Dallas & Wichita Railroad, having been surveyed on the alternate section system, it is not unlikely that some of the land is State land and some of it railroad land, the former being subject to entry under the mining law.

From our camp in the Chisos mountains I have made a special trip to the new finds and can now confirm the reports that reached me some time ago. The cinnabar is in the Edwards limestone, and is closely associated with well crystallized calcite. It is distributed both in the limestone and in the calcite and has on the south wall a strong fissure of igneous rock, closely resembling rhyolite, but requiring further study. The find was made in a little gap near the top of the mountain, which reaches an elevation of 5,735 ft., and, later, another find was made toward the foothills on the north and at a much lower elevation. The samples, secured in person from the deposit, are of good quality. A notable feature is the cinnabar encircling bunches of calcite crystals. These seem to have filled a pre-existing cavity in the limestone and to have been deposited on the cinnabar. These specimens are most beautiful, the calcite crystals showing well against the crimson lining.

Toward the east, and about one-half mile from the opening, there is a bench of snow-white marble, of coarse texture, formed, probably, from the limestone by the action of the dike already mentioned. It is not extensive, but seems to have been used as a 'marker' by the prospectors, as several shallow excavations have been made along its course.

In a direct line from Terlingua, Big Christmas mountain is about 20 miles, northeast. A portion of the drainage goes into Tornillo creek to the east, another portion into Rough Run, and then into Terlingua creek, southeast and south, while still another portion goes directly into Terlingua creek, on the southwest and west. The district has been the scene of much igneous activity. Little Christmas mountain, two miles south, and the Corazones, four miles north, being masses of hardened lava of several distinct varieties. Big Christmas mountain is composed almost entirely of Cretaceous limestone (Edwards) and is traversed by many dikes of igneous rock. These make out towards the northeast, east and southeast across the foothills and the flats, preserving a fairly uniform course for several miles. From the top of the mountain they look like spokes radiating from the hub of a wheel. The material composing them is now under investigation.

The best finds on Big Christmas mountain have been made where these dikes cut through the limestone and where there has been a development of calcite crystals.

The new district may be reached by the Southern Pacific Railway, from Alpine, or from Marathon, the distance from Alpine being about 75 miles and from Marathon about 65 miles.

Active prospecting is now in progress. In the Terlingua district the Marfa & Mariposa Mining Company is operating two 10-ton Scott furnaces. The Chisos Mining Company has four 600-lb. iron retorts at work. The Big Bend Cinnabar Mining Company, at Study Butte, has let the contract for a 50-ton Scott furnace and Harry Dryden is burning the brick on Terlingua creek. The Sanger Brothers, Dallas, are still opening their property east of Study Butte.

Other letters, dealing with the present condition of the quicksilver industry in Brewster county, will follow.

*Director of the University of Texas Mineral Survey, Austin.

THE AMERICAN MINING CONGRESS.

The official call for this Congress, signed by J. H. Richards, president, and Irwin Mahon, secretary, announces that the meeting will be held in Portland, Ore., beginning at 10:30 a. m., August 22, and continuing until August 27. Among the special points for discussion are the mining laws of the United States and the establishment of a department of mines and mining. The question of establishing the Mining Congress on a stable basis, with permanent business headquarters, will also be discussed. During the session of the Congress there will be a display of the minerals of the State of Oregon, and of such other States and Territories as may desire to contribute. There will also be an opportunity for several excursions on the Columbia and Willamette rivers, and to other points in Oregon.

We have already referred to the appointment of delegates, and it is expected that a large number will be present.

Among the papers promised are the following:

Annual Address of the President, J. H. Richards, Boise, Idaho.

The Lewis & Clark Exposition at Portland, by several speakers.

A Department of Mines and Mining, William A. Sulzer, New York.

Relation of Mining to the World's General Advancement, H. W. Scott, Portland, Oregon.

The Promotor and his Place, O. B. Andrews, Lincoln, Neb.

A Branch Mint in Oregon, United States Senator John H. Mitchell.

Statutory Protection for Mining Investors, F. G. Shaffer.

Concentration of Copper in the Southwest, F. H. Probert, Los Angeles, California.

Financial Aspects of Mining, J. T. Wertz, Washington, D. C.

Good Roads in Mining Sections, R. W. Richards and James W. Abbott.

Cyanide Ores of the Black Hills, A. T. Brown.

Flotation of Mining Stock, William L. Wilson, Denver, Colorado.

Papers on the Location of Permanent Headquarters for the Congress will be presented by O. W. Powers, of Salt Lake, and by J. A. Callbrath, Jr., and H. C. Hamlin, of Denver.

Papers have also been promised by T. A. Rickard, C. W. Hays, and others.

Papers upon the mineral resources of the different States have also been promised by a number of the State geologists, and several papers on the Mining Laws have also been promised by mining men.

Spain produced 175,109 tons of lead in 1903, exceeding the output of all other countries except the United States. Mexico is the third largest producer, and Australia comes fourth in order.

Asbestos is the leading mineral product of Quebec, the value of the annual output exceeding that of any other substance mined in the Province. In 1903 the total production of asbestos was 39,167 short tons, valued at $930,262. There were seven companies in operation, employing 1,300 men and paying $412,000 in wages. The Canadian asbestos belongs to the serpentine variety and is of unusually high grade, much of it being suitable for weaving and other purposes to which the amphibole variety is not adapted.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

MEXICO AND THE AMERICAN PROSPECTOR.

The Editor:

Sir.—In the Correspondence Column of your edition of July 7 there appears a letter from Sonora entitled 'Mexico and the American Prospector.' It is a well written letter in many respects, but there is one statement in it that the writer will endeavor to show is not correct, and three other points that need qualifying. As one interested in Mexico, and particularly in Sonora mining, the writer asks space in your columns to discuss these points, for the reason that the article already published is liable to influence against this State the very class of people that its writer suggests can do well in Sonora. The three minor points will be mentioned first.

1. The statement that the Mexican boom is "already on the wane" gives a false impression. Since President Diaz achieved the marvelous result of making life and property in Mexico safer than they are in the United States the mining industry, in common with agriculture and manufacturing, has grown steadily and rapidly, as the published statistics show. There has been no general boom—merely the encouragement given by new properties, properly operated, entering the dividend-paying class. Several Sonora "wild-cats" have come to grief recently, and it appears that this class of boom is on the wane, but legitimate mining is progressing satisfactorily, and the State is producing a larger tonnage of ore and greater value of metal with each year. Statistics on this point are available at the banks and at the government Departmento de Fomento.

2. The "typical" American prospector who has failed here must not be confounded with the experienced prospector who understands his business and has been at it for years in various parts of the world. The latter will find Sonora a splendid field for his labors, but he requires a little financial backing for reasons which will be explained later on.

3. The statement that the "people look down at manual labor as degrading" brings up a point foreign to this discussion, but one of great importance here and not fully understood by many Americans operating in Mexico. The Mexican laboring classes have a highly developed lazy strain in their blood. For three centuries, or more, they have lived under a vicious system of peonage, working for a pittance, which they received in the form of goods from their employer's store and so regulated that they were chronically indebted to the store and unable to move away to better their condition, because subject to arrest for debt. Under the excellent administration of the present government, and the increased demand for labor, caused by capital invested in mines and industries, this system has been destroyed except in isolated, exceptional cases.

The crushing discouragement this system has bred in the laborer is now apparent in his utter inability to see any reason why he should do more work than is absolutely necessary to earn food and clothing for his family and a little over for his drink. And more than this he will not do. If wages are kept low, so that he is obliged to work six or seven days a week to earn the money the family needs, he does so, and is contented, law-abiding and happy. When a new mine starts up in a region where labor is somewhat scarce, under foreign management, and under a superintendent inexperienced in Mexico, he often offers more than the local scale of wages. He may do this with an idea that he will "get the best men," or that he is here as a missionary to "improve conditions," or even to show that this company is "above taking advantage of the poor laborer who does not know the value of his work." The writer has actually heard all these reasons stated by superintendents. As a result he does get everybody he can use at the start, but he fails to improve conditions, and for two or three days after his first pay-day his plant is paralyzed, because many of his men are drunk on their extra money and the majority of the others are enjoying affluent idleness, basking in the sun. If the employer approach these and invite them to return to work, they smilingly show him a dollar or two and ask why they should work all the week when they can now earn in five days what they formerly earned in seven!

The net result of the raise is a disorganization of his own and neighboring mines—a withdrawal of labor from the ranches, thereby hurting and antagonizing the Mexican employers of labor, and increase of drunkenness and consequent disorder, because the Mexican is a most orderly citizen when not intoxicated.

In an experience over the northern part of the Republic the writer has found that the above stated conditions prevail, and he is informed that it is even more true in the southern States. On the other hand, he has never seen any evidence that the Mexican regards manual labor as "degrading." He has never heard a laborer jeered at even when doing most repulsive work.

4. The statement is made that Sonora and Sinaloa "is one of the best prospected districts in the world." So far as Sonora is concerned this statement is true only to the extent that it is highly improbable that veins can be discovered that will pay in gold or silver on the surface. The surface has been well prospected, and the article quoted from explains why. But below the surface Sonora is almost virgin ground for the prospector. The *antiguos* never did any development work, but on almost every outcrop that might carry ore they made slight excavations, rarely more than a few feet deep. If ore was not encountered immediately the spot was abandoned. If a profitable ore-body was discovered it was worked out, but no dead exploratory work was done looking for another ore-body in the same vein, so we now find many old mines of shallow depth (rarely exceeding 100 ft.) that have evidently been worked at a profit. These are now badly caved and frequently contain water, so it is impossible to examine them satisfactorily except at considerable cost. It is easy to hear traditions of the great value of the ore output from these old mines and how the Indians or a big flow of water stopped operations. Possibly there are some old mines where these conditions have prevailed, but if so they are still in the hands of the old Mexican families, who work them if the ore is still in sight and try to sell them as soon as the ore pinches. In the great majority of cases, however, the old miners cleaned out the ore-body before abandoning the mine. In some cases the vein is faulted off at the bottom of the mine; in others it has pinched out, but most frequently it continues down as a well-defined but barren vein.

These old workings are valuable as evidence that the vein carries ore, but the widely-circulated idea that it is only necessary to clean out an *antigua* mine in order to encounter fine ore-bodies is a fallacy that has wrecked many small companies. The gambucinos have availed themselves of all such opportunities.

There are two kinds of prospecting that can be carried on in Sonora at present with good results: One is to explore the many veins that outcrop on the surface with every appearance of being favorable channels for the deposition of ore, but which assay nothing on the surface, or mere traces. These include various forms of contact deposits, chiefly between limestone and rhyolite; narrow zones of quartz replacement and mineral enrichment along fracture planes in the recent eruptives; massive quartzite lenses with hematite, copper carbonates and often gold, usually occurring in the vicinity of rhyolite and unaltered limestone; and rarely a quartz-filled fissure vein.

The second method of prospecting is to explore the veins which show the old workings. This means either diamond drilling or dead drifting along (not across) the barren vein, searching for other ore-bodies where one had already been found. But cleaning out the old mine in the expectation of finding ore still left in the bottom leads to trouble, because people have been right here for three centuries looking for ore.

For these reasons the prospector needs experience and capital, and so equipped he ought to win out. A very satisfactory proportion of the prospecting thus carried on in a competent manner is meeting with success. This kind of prospecting has scarcely begun, yet Sonora has probably reached second place in production of the Mexican States since the last statistics credited her with third place.

J. NELSON NEVIUS.

Hermosillo, Son., Mexico, July 30, 1904.

PROPOSED "REPLACEMENT" OF THE LAW OF THE APEX.

The Editor:

Sir.—I note Dr. R. W. Raymond's remarks on the United States mining laws and the invitation to discuss the matter, in the issue of the JOURNAL for June 16. Without having had any personal experience with the known unsatisfactory United States laws, I have had much to do under the extremely good, though not perfect, Mexican mining laws, since their reformation in 1892. I may, therefore, be able to make a few suggestions worthy of study.

I note that many consider the present Apex law as satisfactory; it would be highly so, I should judge, to lawyers and blackmailers.

In the JOURNAL for July 14 Mr. Max Boehmer makes some very pertinent remarks, and shows how the present law could be materially bettered. I believe, however, that he is right when he says in the first part of the second paragraph: "The best remedy, no doubt, to cure the evil of the Apex law would be to repeal it altogether and confine each owner to his surface boundaries extended vertically downward." Taking this stand, I shall try to show why this is best, and how it can be carried out in a satisfactory manner in the United States.

That a mining claim should have definite boundaries on its four sides, which should extend vertically to the center plane of the earth, must appeal to all miners as logical and safe.

Mr. Boehmer says, "that this has not been done seems to prove that public sentiment is still strongly in favor of a law which gives to the discoverer the right to follow his vein in depth." This would be sound reasoning if all ledges, or ore-bodies, were regular; but those of us who have followed mining for any length of time know that the rule is, that ledges are not regular, and that most mining sections are faulted, and that many fissures split and show two or more apexes on the surface.

I call to mind two cases: one, due to faulting, Fig. 1, and the other due to the vein splitting, Fig. 2, which will illustrate the fallacy of the apex doctrine, and the danger of the right to follow the ledge downward indefinitely, and I have no doubt but that every mining engineer of five years' actual practice can furnish other examples. Either of these cases, under the present law in the United States, would mean certain law-suit, as the ledges were very rich in both cases.

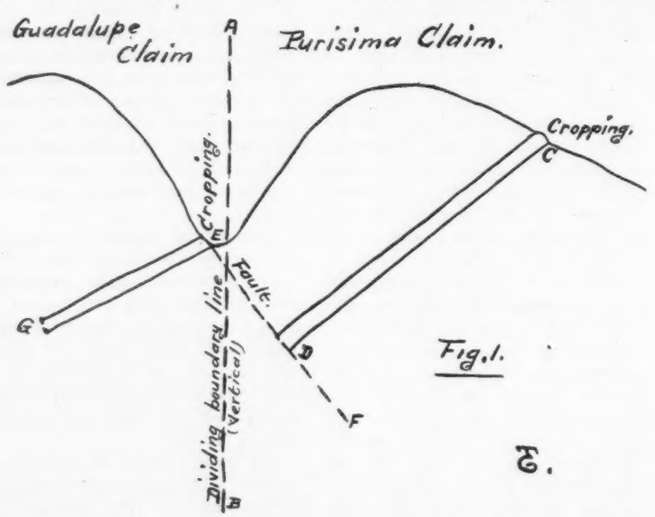

Fig. 1.

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Under a law which bounded the claim, horizontally, by vertical planes, each owner would work out the ground to his boundaries, and no more. Nothing could be more reasonable or equitable, and the chance for a suit from outsiders or for blackmail would be reduced to a minimum.

One reason barring the "fixed" claim in the United States is, that the Government, to date, has not reserved the right to all minerals and metals when transferring title to the public domain. Any change, to be equitable, would have to recognize the present illogical condition; and all claims now located or patented would have to be respected and left under the present statutes, to work out their own salvation, unless the owners should decide to secure title under the new laws, which option should be given them.

In contemplating any change, the Government should start in by declaring all metals and minerals, excepting coal, iron, salt, oils, gypsum, borax and all sodium and potassium compounds, limestones and building stones, and all rock formations not carrying values, to be reserved as Government property, even when the surface rights shall have been transferred by sale or otherwise, it being understood that the metals and minerals excepted belong to the owner of the land. This should be done for two reasons: One, because it would forever stop the doubtful practices now prevalent in the classification of the public lands as mineral and agricultural; and the other, because it would definitely reserve the metals and minerals, not specified as going with the lands, for locators, even if the land should have been sold to individuals. This would be a benefit to the country at large, because it would reserve the mineral and metal products of the country, on all lands not sold up to the date of the new law, to the prospector and to location at any time, by anybody.

Once this provision has been made by the Government, a new mining law could be enacted making provisions for the location of claims; and the size of these should be fixed by some unit, each as a square of 100 meters (328 ft.) per side. A claim should have no limit as to length or width; but, to prevent the abuse of this right, to the detriment of public rights, a federal tax should be imposed on all units, so much per year; and as long as this tax was paid the locator would hold undisputed title to the claim.

The acquirement of the claims by the locator should be made as easy as possible, all red tape being eliminated. The claim could be as long and as wide as desired by the locator, as long as it was composed of even units, where the vacant ground permitted it; but irregular pieces between claims already located could be taken up as such by any applicant. To illustrate: On a vertical ledge the locator could take up a claim of 6 units long by one wide, making 6 units; where the ledge dipped at any angle he could locate a claim of 6 units by having it 4 units long and 1½ units wide; or it could be 3 units long by 2 units wide. Should the unit be a square with 100-meter sides, the last claim would be 300 meters (984 ft.) with the strike, and 200 meters (656 ft.) with the dip, which would protect a ledge of 45° for nearly 300 meters (984 ft.) along the dip. According to the angle should be the width of the claim, calculating to protect the ledge for 1,000 ft. or more along the dip. The law should allow claims to be located in any mineral section, whether there was an outcrop or not.

As already intimated, the securing of the title should be made as easy as possible, but this once issued, a guarantee of good faith should be exacted from the locator, in the shape of a federal tax, say $5 per year per each unit in the claim. In this way the six-unit claim described above would pay a yearly tax of 6 × $5 or $30, which should be collected in advance at the beginning of the fiscal year.

The outlined proceedings would demand the appointment of a mining commissioner in each county of every mining State, and, also, a mining surveyor; both of these officials would receive fixed fees, to be defined by law. The locator would have to make a petition to the commissioner for a claim of a certain number of units, naming how many and how located on the ledge, the location of which (the ledge) should be given definitely, with its strike and dip. The commissioner would then commission the surveyor to survey the claim and mark all necessary monuments for the boundaries of the same, which should be built by the locator as soon as he received the title, this being a vital obligation. The surveyor should deliver his report of the survey, with maps in triplicate, to the commissioner within 60 days from the date of his appointment, and the commissioner, in turn, after 60 days more, there being no opposition, should send in a copy of the proceedings with two copies of the plans of the survey to the proper department in Washington, where, after due examination, the title would be issued and sent to the commissioner, who would deliver it to the interested party.

Once the title was acquired, the holder should be required to pay a tax, as already indicated, which would guarantee his possession of the claim, as long as he paid it. Should he fail to pay the taxes for one year, the commissioner, acting under orders from the Treasury

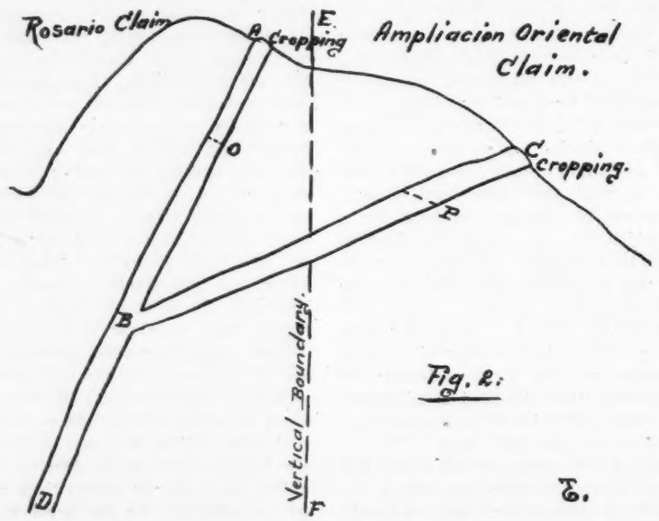

Fig. 2.

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Department, would call in the title, and the claim would be free again and open to relocation.

No privileges for prospecting should be given; but the whole of the Government domain, and private lands also, titles to which having been acquired after the date of the new land law proposed, should be held free for all prospectors and locators, without restrictions.

No work should be required done on the claims, either before or after title is issued, each owner being left in entire liberty to do as much or little as he was able, or as he desired to.

The tax imposed is for two ends: First, that it may compensate the Government for the exclusive privilege granted the locator; and second, because it would act as a safeguard to prevent irresponsible persons from holding large sections of valuable ground for indefinite periods as a speculation, to the detriment of public interest.

The commissioner's fees for each claim, whatever its size, should not exceed $25, $10 to be paid upon making the application, and $15 when the title is delivered. Should any opposition be made, special fees should be allowed and provisions should be made for such opposition and the deciding of same. The surveyor's fees should not be less than $25 nor more than $100, according to size of claim and the physical difficulties encountered in making the survey. A reasonable mileage each way should also be allowed. The Government might also add a small title fee of say $2.50 to cover such expense.

A general law could be framed for a starter, which could be amplified by circulars from time to time, covering doubtful points as they arose, these new findings to be made by the proper Department at Washington, to which all such difficulties should be submitted by the commissioners.

Many minor points come to mind, but with these general suggestions I must be satisfied for the present. E. A. H. TAYS.

Fuerte, Mexico, July 30, 1904.

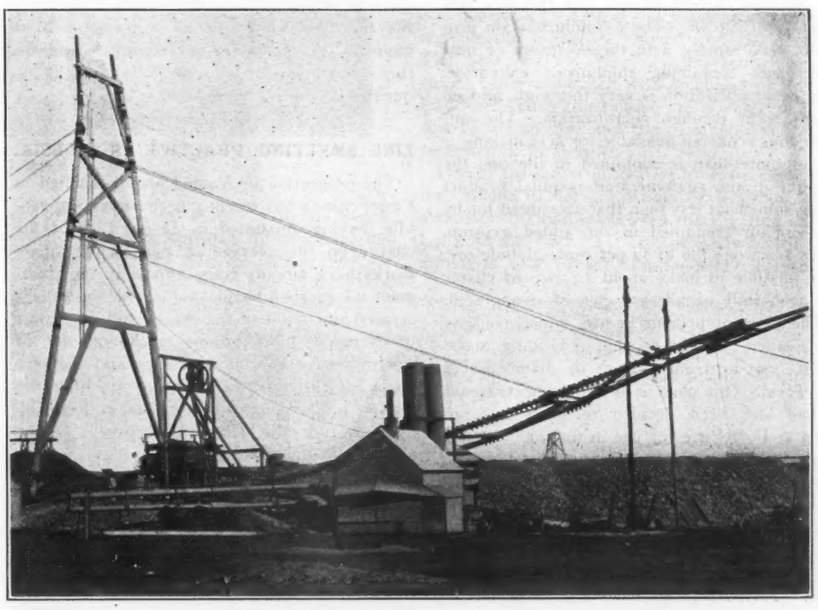
HEAD FRAMES.

The Editor

Sir.—The article appearing in the *Journal* of July 14 on the 'Design of Head-frames in the Mississippi Valley,' is of considerable interest to me, as I have been engaged in the design and construction of several head frames—or 'poppet-heads,' the local name—in Western Australia. A description of a large set erected on the Golden Link mine at Kalgoorlie may be of interest.

The flat country peculiar to this district necessitates very high 'sky frames' over the mine shafts to obtain sufficient height for the delivery of ore to the bins, the extra few feet of haulage of the shaft cages containing the ore trucks adding very little to the general cost, whereas if the ore was first dumped near the surface, and then again elevated to the bins, it would require separate power and machinery. It is therefore the custom to erect the head-frames high enough to give direct delivery to the ore bins from the second or third brace, or platform, on the framing. The first (or lowest) being used for the delivery of 'mullock' or waste rock to the dumps.

The height of this particular head-frame was decided upon from the greatest obtainable length of the legs, four in number. These were of karri, a species of Eucalyptus growing near the southwestern coast of the State, very like jarrah in appearance. This wood was known in the early days of the penal system as 'Swan river mahogany,' a dark red timber of great strength, having a specific gravity of 78. The legs were 103 ft. long, having a base diameter of 27 in. and a diameter at the top of 10½ in. They were all perfectly straight, having no bumps nor projections, and gradually tapering from base to top. They had grown in one of the magnificent valleys of the southwest, where beautiful specimens of tall tapering giants of the forest may often be seen 150 ft. high, the trunks being without a branch to within 40 ft of the top. The skeleton framing was constructed also of karri, sawn and squared, mortised and tenoned to the legs. The accompanying illustration will give a good idea of the method of construction used, also of the dimensions of the framing. The method of erection adopted was to construct the two side-frames complete with all the cross girders, braces, etc., fitted and bolted in place. Each of these weighed approximately 21 tons, and they were framed and bolted together on the ground in position ready to be raised. A large derrick 85 ft. high was erected on the dump, near the shaft collar, and a series of wire ropes run through multiple-wheeled pulley-blocks were attached to the three braces—first, second and third—and the ends taken to three large crab winches, each worked by six men. The frames were raised first to an angle of about 20° by means of two smaller derricks, as shown in the cut herewith and the strain then taken onto the main central derrick. The eastern frame was raised first, and when erected in place was used as a derrick to raise the second frame.



HEAD FRAME IN COURSE OF ERECTION, BOULDER, WESTERN AUSTRALIA.

The cut shows the first frame raised in place and the second frame raised to an angle of about 20°. At this point an accident happened. The strain had been transferred from the two small derricks to the first raised frame, and the sudden increase of strain on the wire fly-ropes holding the first frame in place, caused them to stretch, making the bulge on the vertical legs that can be seen in the photograph. The one that was being raised had to be re-hung to the small derricks, and the fly-ropes tightened and made fast before progress could be made. The sudden drop of the frame, caused by the stretching of the fly-ropes, made a slight transverse crack on one of the legs being raised first at the mortise at the junction of the first girder which looked very ominous, and the writer who was in charge of the work had an anxious time for a few minutes before a fish plate in the shape of a 20-ft. by 10-in. pole could be lashed to the leg. Of course this could have been done more easily by lowering the frame to the ground, but this would mean losing the whole of the labor and time that had been expended in raising the frame to the apex of the small derricks, so the risk was taken and the lashed fish pole fixed in place while the frame was in mid-air—and successfully. The two frames took some days to raise, and when erected the side framings were hoisted up and fitted and bolted in place. Another difficulty that had to be overcome was the existence of a small gallows frame 20 ft. high that was being used, during the whole period of erection, to haul water and ore from the shaft. The hoisting engine and house attached to this frame can be seen in the photograph, and work only stopped during a very few minutes during the whole period of construction.

The collar of the shaft being 10 ft. above the general ground level, and surrounded with broken rock, the head-frame had to be erected on the top of the dump. Massive foundations of cement concrete were built under each leg, into which foundation bolts, anchored to railway iron cross ties, were bedded. These bolts were fastened to large sole-plates of timber; 3-12 in. by 18 in. by 8 ft. timbers side by side bolted together. The sole-plates had each two strap bolts 6 ft. long attached, which were again bolted to the foot of the legs.

E. BARTON HACK.

Denver, Colo., Aug. 3, 1904.

Bavaria, which supplies most of the lithographic stone used in the world, produced 9,890 metric tons of that material in 1903. The value of the output was $212,150.

MAKING SULPHURIC ACID AT BROKEN HILL.

By Our Special Correspondent.

The Broken Hill Proprietary Company has entered upon the manufacture of sulphuric acid on a commercial scale. The acid is practically a by-product, being made from the gases emanating from the desulphurization of the ores, concentrates, etc., by the Carmichael-Bradford process. The acid can be made at a minimum of cost and thus materially enhances the value of the processes recently introduced for the separation of zinc-blende from the tailings by flotation. The following particulars are taken from a recently published description of the process: The ores, concentrates, slimes, etc., as the case may be, are mixed with gypsum, the quantity of the latter varying from 15 to 25 per cent. The mixture is then granulated to the size of marbles and dumped into a converter. The bottom of the charge is heated from 400 to 500° C. It is then subjected to an induced current of air, and the auxiliary heat is turned off. The desulphurization proceeds very rapidly with the evolution of heat and gases containing sulphurous anhydride. The desulphurization is very thorough, and no losses occur through volatilization. The sulphur thus rendered available for acid making is rather more than is contained in the ore, the sulphur in the agglomerated residual product being somewhat less than that accounted for by the sulphur contained in the added gypsum. Thus from one ton of 14 per cent sulphide ore, it is possible to make about 12 cwt. of chamber acid, fully equalling 7 cwt. of strong acid.

The plant at present in use, which consists of a leaden chamber capable of holding 40,000 cu. ft., can turn out 35 tons of chamber acid per week. This plant is being duplicated, and it has also been decided to erect a large plant at Port Pirie for use in the manufacture of superphosphates. It is claimed that the production of sulphuric acid from ores containing only 14 per cent of sulphur establishes a new record.

THE FAIRBANKS PLACER DISTRICT ALASKA.

In 'Bulletin 225' of the United States Geological Survey, Mr. L. M. Prindle describes the gold placers of the Fairbanks district in Alaska. The area included in this district lies between the Chena and Tolovana rivers and is drained by their tributaries. It is 140 miles southwest of Circle, 200 miles in a straight line west of Eagle, and perhaps 200 miles above the mouth of Tanana River. This region forms a portion of what is known as the Fairbanks district, where present interest is directed mainly to the valleys of a few small streams, which head close to one another just within the hill country about 12 miles north of Tanana river. Gold was discovered on one of these tributaries of the Tanana in July, 1902, and the creek was named Pedro creek in honor of the discoverer. The streams in which gold has been found in the Fairbanks district all head far back in the Yukon-Tanana divide and flow westward or southwestward.

The creeks of present economic importance are Pedro creek, called Gold stream below the point where Gilmore enters it, and Twin creek, a tributary of Pedro; Cleary creek, with its tributaries, Chatham and Wolf; and Fairbanks creek. They are but a few miles apart and are separated by broad divides that rise 1,000 ft. or more above them, and flow in divergent courses—Pedro towards the southwest and west, Cleary towards the northwest, Fairbanks towards the east.

These are the only creeks in the Fairbanks district which up to the present time have afforded paying deposits. The conditions of the occurrence of gold on all of them are essentially the same. No foreign wash has been observed, and it would seem that the gold is derived from the rocks in which the creeks have cut their channels. The pay is generally found at considerable depth, and, except at a few localities, in frozen ground. The creeks are small, carrying hardly sufficient water for extensive operations, and their grade is low. Timber for mining purposes on most of these creeks must be freighted for several miles from the lower valleys. Trails along the ridges are mostly good, but where they traverse the swampy areas along the creeks they are generally bad.

Notwithstanding the inaccessibility of the district, which can be reached only by trail, the high price of supplies, and the lack of money necessary for the development of claims, this district produced from $30,000 to $35,000 during the short summer of 1903.

ZINC SMELTING PRACTICE IN SILESIA.

The proportion of roasted blende smelted in Upper Silesia has recently been increasing rapidly, having amounted to 42 per cent of the charge on the average in 1902, while single works have already come almost to the treatment of roasted blende alone. With the increased zinc tenor of the charge and its change in character, modifications in the practice of smelting have become necessary and the tendency of the smelters who are smelting the highest proportions of roasted blende has been to substitute the Rhenish furnace (known also as the Belgian-Silesian) with its comparatively small muffles (retorts) for the conventional Silesian furnace with its large muffles, each holding approximately 100 kg. of charge. Because of its great size and weight, the Silesian muffle must be seated on a solid hearth and it is impossible to attain the high temperature that is maintained in the smaller retorts of the Rhenish furnace, which are heated from all sides, and is necessary in distilling charges that are high in roasted blende.

F. Cochlovius has discussed this question in the *Zeitschrift des Oberschlesischen Berg und Hüttenmännischen Vereins*, for March, 1904, pp. 81-84, where he expresses the opinion that the same results can be obtained with the Silesian muffle as with the Rhenish, if the former can be heated as effectually, which would imply either an increase in the temperature or a prolongation of the time of distillation. Results being the same as to extraction of metal, the large muffle should be preferable, because (1) the proportion of zinc absorbed in the retorts and condensers is less, (2) the zinc penetrating the retorts is less, (3) the number of cracks in the retorts leading to loss of zinc is fewer, (4) the loss of zinc vapor filling the retorts and condensers at the end of the distillation is less, while (5) the labor per ton of ore is less, the larger are the retorts, and (6) the room in the furnace is better occupied with large retorts than with small. Finally, most of the works in Upper Silesia are equipped with the ordinary furnaces with large retorts, and any modification which would permit of their continued use, rather than the substitution of entirely new furnaces, would be advantageous.

Cochlovius proposes to prolong the time of distillation by abandoning the present method of charging and discharging the furnace, whereby the maneuver occupies nearly eight hours, leaving only 18 hours for the distillation, and substituting a handling of the muffles by series of pairs, thus carrying on the maneuver and distillation continuously. Since a pair of muffles can be discharged and recharged in 40 minutes, a distillation period of about 23 hours would be attained. Two men would be able to handle 24 muffles in eight hours, wherefore a 72-muffle furnace would require six-man shifts per 24 hours.

Cochlovius considers that in this way it may be possible even to distill a blende charge alone in the large muffles, adding sufficient burned lime or cinder to loosen up the charge, and sees various advantages, among others a lightening of the work of the furnacemen and improved hygiene. He foresees certain possible disadvantages, but considers the experiment well worth the making, especially since it involves no changes in the existing plants.

COAL IN BRITISH INDIA.

The output of coal in India during the year 1903 amounted to 7,480,589 tons, against 7,424,480 tons produced in 1902, and 6,635,727 tons in 1901. The quantity of Indian coal consumed by railways in India was 2,203,889 tons, against 2,091,992 tons in 1902 and 1,956,631 tons in 1901. The quantity exported by sea to Indian ports in 1903 was 1,235,318 tons, and 723,873 tons were exported to ports outside India (including Burma), against 974,602 tons and 728,316 tons, respectively, in 1902. There was therefore an increase in the exports to Indian ports (excluding Burma) of 260,716 tons.

Bengal produced more than three-fourths of the total output of 7,480,589 tons in 1903. The production of Bengal coal was 6,403,503 tons, against the following outputs in previous years, exceeding 3,000,000 tons, namely:—

	Tons.		Tons.
1896	3,037,920	1900	4,978,492
1897	3,142,497	1901	5,487,585
1898	3,622,090	1902	6,259,236
1899	4,035,265	1903	6,403,503

The production in 1885, nineteen years ago, was only 1,123,700 tons, and it did not get up to 2,000,000 until 1894, when the output was 2,035,934 tons.

Among the other coal-producing provinces the Nizam's Dominions come next to Bengal, with a production of 362,733 tons of coal in 1903, against 455,421 tons in 1902. The decrease was due to the collapse of some pits at the Yellandu Colliery, and to a smaller demand for coal at the Colar Gold-fields, which are now worked by electricity, the power being provided from the Cauvery Falls.

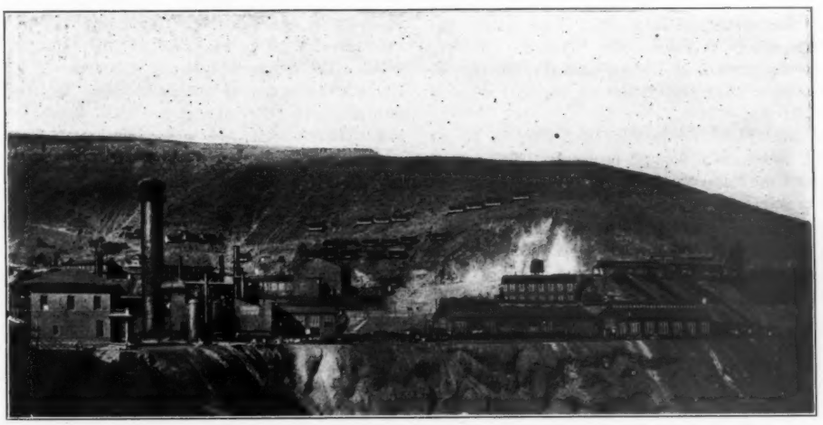
The production of the Assam coal-fields increased from 221,096 tons to 239,321 tons, but that of the Central Provinces fell off from 196,981 tons to 159,066 tons. The outputs of the Beluchistan, Punjab, and Burma mines all show declines, but the Bikanir coal-field in Rajputana raised its production from 16,503 tons to 21,764 tons. Kashmir for the second year figures as a small producer of 999 tons. Its mineral wealth is believed to be immense, but it requires an outlet by railway.

The Tamarack No. 3 shaft in the Lake Superior copper region has just attained a vertical depth of exactly 5,000 ft. The Tamarack has the deepest shafts in the world, with the exception of the Red Jacket shaft of the Calumet & Hecla.

THE MINES OF PRESCOTT, ARIZONA.

EDITORIAL CORRESPONDENCE.

The outlook for the mining industry in eastern Yavapai county is most encouraging. The construction of the Prescott & Eastern branch of the Santa Fe, Prescott & Phoenix railroad has brought the Bradshaw Mountain region into prominence as a profitable field for prospecting and developing, and it is now one of the most active districts in the Territory.



JEROME, ARIZONA.

At Jerome the operations of the United Verde Company are again assuming normal proportions, after a period of diminished output due to the underground fire that prevented access to portions of the mine. The company is rebuilding its smelter, and has also undertaken a number of improvements to facilitate mining and treatment of the ore. Jerome has suffered from the reaction that inevitably follows a mining boom. Affairs are now on a solid basis, however, and the situation holds more of promise so far as concerns the legitimate development of the district than the specious prosperity of a few years ago. The recent erection of a smelter, a short distance from the town, to treat the ore from the Equator group of mines is an event that should have a beneficial influence on the mining industry.

The mineralized region of eastern Yavapai county forms a portion of the mountainous belt that extends across Arizona in a southeast-northwest direction. Within the limits of this belt are included the Clifton, Globe, Bisbee, Tombstone and most of the other important mining districts in the Territory. It is characterized by short, nearly parallel mountain ranges rising abruptly from broad, alluvial valleys. Structurally the mountains resemble the Basin ranges of Nevada and Utah, being formed by block-tilting, or monoclinal flexures, with frequent faults. In the Black and Bradshaw ranges the basal formation consists of pre-Cambrian schists and granitic eruptives, intersected by dikes and overlaid unconformably by Paleozoic strata, chiefly limestones. The latter rocks seem to have played here a subordinate role as factors in ore-deposition, in contrast with the well-known type of deposits so characteristic of the Southwest. The ore-bodies for the most part are veins and lenticular masses in schists and do not extend into the limestones above.

Within the Bradshaw mountains and their outliers there are a large number of properties under development, or actively engaged in production. Some of the more important districts are the Big Bug—including the mines around McCabe—which is a producer of gold, silver and copper; the Lynx Creek gold district; the Peck silver and copper district; and the Tiger and Pine Grove districts producing gold and silver. While thus far no mines have attained any great importance individually, the output in the aggregate is fairly large and is increasing. Several of the gold mines are supplied with stamp mills of from 10 to 20 heads. Amalgamation supplemented by concentration is generally practised. The refractory ores are shipped to El Paso or Val Verde for treatment.

The Iron King mine, owned by the American Copper Company, is situated at Blanchard, a station on the Prescott & Eastern railroad, some 20 miles from Prescott. The company has been in operation about two years. The ore-body consists of an impregnated zone in schist carrying sulphides of copper, iron and lead in a quartz gangue. The quartz has the form of veinlets and flattened lines parallel in direction to the strike of the schist. Usually the lenses occur in overlapping series. Seven shafts have been sunk on the lode, of which the deepest is 380 ft. The oxidized ore near the surface, carrying gold but little copper, is being treated by the cyanide process. At present the mill is supplied with six quadruple discharge stamps, but it is intended to double the capacity. A 100-h.p. gas engine coupled to a 75-kw. two-phase generator is used for power purposes. The cyanide plant comprises six 50-ton sand-leaching vats and six slime vats with cone bottoms.

In the vicinity of McCabe a series of quartz veins carrying gold and silver with small amounts of copper are being exploited by several companies. Among the mines now working are the Gladstone, Model and Dividend. The ores are of refractory character, their values being associated with sulphides of iron, lead and zinc. The richest ore is shipped direct to the smelter and the remainder is concentrated in local mills.

One of the larger properties in this section is the Poland mine, consisting of a group of claims on the divide between the Big Bug and Lynx Creek districts. The property was acquired in 1901 by the Development Company of America, which also owns the Tombstone, Congress and Silverbell mines. A large amount of development has been done on the mine, and when present improvements are completed

UNITED VERDE SMELTER, NEW HEAD-FRAME AT UNITED VERDE MINE.

it will be well equipped for extensive operations. The Poland tunnel undertaken by the company cross-cuts the property for a distance of 8,000 ft., intersecting the lodes at a depth ranging from 650 to 900 ft. Besides the advantages which it affords for mining and drainage, the tunnel gives an outlet to the Lynx Creek district, hitherto reached by a 14-mile wagon road over heavy grades. The reduction works and mills are situated at Poland, the terminus of an 8-mile branch of the Prescott & Eastern Railroad. The mill is supplied with 20 stamps. Production operations have been suspended for about a year awaiting the construction of the tunnel, which has just been completed.

The Bradshaw Mountain Copper Company, which has recently purchased the Val Verde smelter, is engaged in developing a group of claims, known as the Copper Cobre mines, situated at Middleton. The ore-body consists of a quartz-impregnated zone in schist carrying chalcopyrite and chalcocite with oxidized ores near the surface. It has been opened by a system of adits driven into the side of the mountain at successive levels. The principal adit is some 1,500 ft. long and 1,000 ft. below the surface where it reaches the lode; it carries a double track and is used as a main haulage way. A Bleichert tramway, 4,000 ft. long, has been installed to convey the ore from the main adit to the storage bins at the railroad. The upper portion of the lode is to be worked by open-cast methods, and from these workings the ore will be lowered over a gravity incline to the upper terminal of the tramway.

The Val Verde smelter is 22 miles from the Bradshaw Mountain Copper Company's mines and about the same distance from Prescott. It is connected by a short spur with the Prescott & Eastern railroad. The plant has been built on a hillside, facing the Agua Fria river, which affords a perennial supply of water, and the arrangement is such that the ore can be moved by gravity from the storage bins to the feed-floor of the furnace. The equipment comprises a rectangular 250-ton furnace and a smaller round furnace, giving a total capacity of about 325 tons per day. The Bretherton hot-blast system is employed, thereby effecting a notable saving in coke, which is an expensive item in this region. The ores drawn from the surrounding districts are mostly of silicious character, containing a small percentage of copper, considerable zinc and arsenic and some lead. A large portion is concentrates which are briquetted at the smelter. The matte produced carries high gold and silver values. The plant has been in operation for the past two years, but running intermittently owing to shortage in ore supply. As soon as the company's mines at Middleton begin shipping, a more active campaign will be undertaken. The ore from these mines is comparatively free from arsenic and zinc and can be mixed to advantage with the usual grades of custom material. It is the intention of the company to enlarge the capacity of the smelter as soon as the mines are opened sufficiently to assure a steady ore-supply.

In the Verde district some interest is being manifested in the search for new ore-bodies, but the work is now conducted along more conservative lines than formerly. Of the numerous exploration enterprises that were started during the boom period four or five years ago, few have maintained an active existence and none has succeeded so far in discovering anything of importance. Altogether the exploration of the district has been attended with discouraging results.

It cannot be said, however, that the lack of success has proved much in regard to the possibilities of finding valuable deposits. Many of the failures have been due to mismanagement, of which there are evidences on every hand in the way of shafts and other workings that were apparently undertaken without regard to system or the assistance that could be gained from a study of the geological structure of the district. Intelligent exploration has done much to extend the limits of the ore-bearing ground at Bisbee, and there seems to be opportunity for employing similar methods at Jerome.

The United Verde mine will soon be on its old basis as a copper producer. For many years the output of the United Verde alone made Jerome the largest copper mining camp in the Southwest, but since 1899, when the record production of 44,000,000 lbs. was reached, operations have fallen off considerably each year. There is no reason for believing that the decline has been due to any exhaustion of the ore-bodies, as the underground fire which has been burning for the past five years and the necessity of overhauling the surface plant are adequate explanations of the decreased production. The company has recently re-equipped the main shaft, which will afford greater hoisting facilities. The smelter is also being rebuilt; two of the 250-ton furnaces have been replaced by furnaces of 500 tons capacity each, and eventually a third furnace of the same size will be set up. A dust-chamber of unusually large dimensions is also in course of construction. The ore taken from the United Verde mine is almost solid sulphides, with little fine material, and requires no concentration. It is heap-roasted before smelting.

The Equator mines are owned by the same interests as the United Verde. The mines are situated six miles southeast of Jerome, high up on the northern face of the Black range. A smelter consisting of one 250-ton furnace has been erected in the valley below and was blown in last spring. Two classes of ore are mined, a ferruginous quartz carrying gold and heavy copper sulphides; the latter are subjected to preliminary roasting. The matte is run from the furnace into shallow moulds and is broken and hauled by wagon to Jerome for final treatment.

Aside from the United Verde and Equator mines, which are the only producers at present, some work is being done on the Cleopatra and Eureka groups of claims. The former adjoins the United Verde property on the south. The claims are being explored by an adit that will also pass through the King Development Company's ground lying just west of the United Verde. Small quantities of ore have been taken out by both the Cleopatra and King Development companies.

STORAGE OF COAL.—The safeguarding of large piles of coal against spontaneous combustion is a matter that receives considerable attention, to which we have previously referred. In the new coal bunker at the New York Navy Yard, each bin is provided with two galvanized iron pipes, 4 in. in diameter, 20 ft. long, which are so hung that a thermostat may be moved through the entire depth of coal. Each thermostat is connected with a suitably located annunciator, so that a constant watch can be kept on the temperature of the stored coal.

PYRITE SMELTING.—A REVIEW.—X.

By Edward D. Peters.

THE RELATIVE CAPACITY AND ECONOMY OF THE PYRITE FURNACE—CONCLUDED.

A rough balance sheet may serve to bring out the principal pros and cons more clearly, it being understood that it applies solely to heavy pyritic ores.

Pyrite Process—Advantages.

1. No roasting required. (Saving in plant, in costs, in losses of metal, in time.)
2. Great saving in coke.
3. More silica can be used in charge.
4. More complete elimination of Pb, As, and Sb.
5. Heavy spar less objectionable than in ordinary smelting.

Pyrite Process—Drawbacks.

1. Heavier blast.
2. Exceptional care and skill.
3. Shorter campaigns.
4. Possible reconcentration of matte.
5. Zinc more injurious than with a roasted charge.
6. Sulphur fumes are wasted.

Local conditions must decide on which side the balance of profit lies. In the majority of cases the pyrite process will be found the more economical on the heavy sulphide ores that we are now considering. The cost of fuel is the greatest item of expense in ordinary blast furnace smelting, and a method that promises a saving of one-half to nine-tenths of this costly material is entitled to the most serious consideration.

If the smelter is so situated that the sulphur dioxide derived from the roasting of the ores can be used for the manufacture of acid, it becomes a question whether the profit derived from making acid is greater than the gain that will arise from diminishing the coke. It may, perhaps, be found feasible to employ the fumes from the pyrite smelter direct for the manufacture of sulphuric acid. Beardsley finds that the gases from the Mt. Lyell blast furnaces contain little or no free oxygen.

The concentration-smelting of a low-grade matte up to a point suitable for the converters is not so serious a matter as is sometimes believed by metallurgists who have not had occasion to practice it under proper conditions. The simple fusion of matte in the blast furnace (even with the smallest possible addition of coke) is a waste of time, unless the proper chemical reagents are supplied to the charge. It comes out in very much the same condition as it went in. The average enrichment of a 50 per cent matte for one year's work of the former re-melting cupola at the Parrot converter plant at Butte was only about 3 per cent copper, and a considerable proportion of this gain was due to the elimination of the slag that was adherent to the matte when it came to the cupola.

The reagents that must be supplied in order to effect a concentration of the matte are, of course, oxygen and free silica, and, with their aid, a low-grade copper matte may be enriched to 50 per cent, or more, with certainty and economy, and with but a small cost per ton of original ore. As this subject of matte concentration seems to be regarded, in the profession, with a certain amount of suspicion, I quote from two authors who have had large experience with this class of work.

Beardsley says[1]: "Raw mattes, smelted pyritically, can be concentrated from 2½ to

[1] This Journal, June. 30, 1904, p. 1035.

3½ into 1 without much difficulty; and 10 per cent matte can be made into 35 per cent matte and converted as such; and 20 per cent matte can be raised to 55 per cent matte in a single operation."

Freeland, who has obtained such economical results at the Ducktown Sulphur, Copper and Iron Company's works by substituting pyrite smelting for the ordinary roasting and fusion with coke,[2] says: "The reconcentration of the first matte (20 per cent matte concentrated to about 50 per cent copper) presents no difficulties at Ducktown. There is no limit, within the range of matte, to this second operation. A 6 per cent matte may be brought up to 50 per cent quite as successfully as may any higher grade initial matte; nor is this statement based upon odd or occasional samples, but upon more than one carload of matte so made. The degree of concentration, whether in the first (raw ore smelting) or second (raw matte smelting) operation is, in the main, proportionate to the speed at which the furnace is driven, and is controlled by the proportion of quartz on charge, or by the manipulation of the blast, or both. But, on these seemingly simple measures hinges not only the grade of the matte, but the life of the campaign."

The presence of even 5 per cent of zinc-blende in the charge adds materially to the difficulties encountered in the raw smelting of heavy sulphide ores. Nutting, at Bingham Cañon, Utah, speaks strongly regarding its injurious effects, and also experiences much trouble from having to use ores in which the sulphides are mostly in a finely divided condition.

When these two drawbacks are not present in an aggravated form, it seems probable that heavy pyrite ores can usually be smelted raw with cold blast more economically, and with less loss of metal, than by the ordinary method, and that even the necessity of a concentration-smelting of the first matte, to raise it to the proper grade for the converters, will not outweigh the advantages of the pyrite method.

As raw smelting demands a more silicious slag than ordinary smelting, it follows that when the charge is a basic one, and no silicious ores are available (as at Ducktown), more barren quartz must be added than in ordinary smelting. We know also that the pyrite furnace requires a powerful blast, and if, in addition, the price of coke is low, wages are light, and climate and conditions are suitable for heap-roasting, I can well imagine that the ordinary roasting and smelting method might be the more advantageous of the two. If, however, any of the above advantages are lacking, it does not seem probable that it can compete with pyrite smelting; while, if coke and labor are tolerably expensive, and the climate too wet for advantageous heap-roasting, there can be no question as to greater economy of the newer method. If, in addition, there is an available supply of profitable silicious ore, the raw method shows up to still greater advantage.

Since the Mt. Lyell Company has been able to replace barren quartz by a supply of silicious ore of good grade in copper, and can thus eliminate worthless flux, and also produce at the first smelting a matte suitable for immediate converting, it has greatly decreased its metallurgical expenses. During the past half-year it has cost the company only $1.87 per short ton to smelt its raw ores into matte suitable for converting.

The cost of producing metallic copper from the heavy pyrrhotite ores of the Ducktown Sulphur, Copper & Iron Company, Ltd., is 3.018 c. per pound less than by the former method of heap-roasting and smelting with coke. This statement is given on the authority of the smelter superintendent, Mr. W. H. Freeland, and, if we assume (without authority) that the ore yields 2.5 per cent copper, the saving effected by the use of the pyritic method is $1.51 per ton of ore. The amount of coke used in this smelting is, I think, about 3 per cent of the weight of the ore, and the capacity of the furnace, as determined after smelting some 70,000 tons of ore by the new method, is 83.5 per cent of its former duty when smelting roasted ore.

The second variety of pyrite smelting, which has been discussed at some length in the preceding articles, is characterized by a comparatively small percentage of sulphides in the charge, and a correspondingly increased proportion of earthy ingredients. In order to obtain the powerful oxidation required for a high degree of concentration, the coke must be reduced almost to the danger limit, and the tendency to chill at the tuyere zone is, in part, counteracted by warming the blast. The rate of concentration is very high, and the matte production small; the slag is silicious to a degree that would seem impossible in ordinary smelting, the elimination of lead, zinc, arsenic, and antimony extensive, and the result of the slightest irregularities likely to be serious.

If the furnace becomes too cold, the addition of more coke is impracticable, and it would immediately interfere with the established degree of oxidation, and result in two evils: 1. An increased production of low-grade matte. 2. The consequent robbing of the slag of the iron necessary for its formation.

I happened to be at the Val Verde smelter just after the night foreman had feared the furnace was chilling, and had added a very minute amount of coke to each charge for a short time. In a few hours the inevitable result followed. The matte increased in quantity, and dropped from something like 37 per cent copper down to 30 per cent, and the slag became dangerously acid. Bretherton heated up the furnace and restored matters to their normal condition by using two or three good-sized charges of coke, and substituting for the regular ore charge, a properly fluxed mixture of furnace cleanings, foul slag, etc., which already contained its copper contents in the form of properly concentrated matte, and possessed sufficient bases to flux itself, so that the powerfully reducing action of the large coke charge could have no harmful effect on it, and merely melted it and warmed up the furnace at the same time. So that this thin layer of neutral, and already sufficiently oxidized, material served as a buffer to receive without damage the reducing action that was unavoidable, if an excess of heat was to be quickly conveyed to the lower portion of the cold furnace.

As I have pointed out in a previous article, there is a large field in the United States and Mexico (and, doubtless, in many other countries), for this *partial* pyrite smelting. The abolition of a roasting plant, and the saving of from one-half to four-fifths of the coke make it peculiarly suited to remote districts where freights and fuel are expensive.

The decrease in depth of the lead contents in many of the limestone deposits of the Rocky Mountains and Mexico, and the increasing production of dry silicious silver and gold ores carrying only moderate proportions of sulphide minerals, point inexorably to the substitution of matte for lead as a collector of the precious metals; and with the comparatively low tenor in copper, and the general complexity of the ores in the regions referred to, there appears to be no method yet invented so suitable as raw smelting with a high degree of concentration; or, as it has been termed in this review—"pyrite smelting."

Through close competition and long experience, the lead smelter has learned that, if he is to avoid ruinous loss of values, he must keep his slag within certain prescribed and narrow limits. It is not enough for him to hold the *silica* contents of his slag somewhere between 30 and 35 per cent. He must also establish and maintain a suitable ratio between the *iron* and *lime* contents of the slag, and this is a very expensive thing to do, where the requisite ores do not exist in the proper proportions.

It is here that the smelter of roasted copper ore has an enormous advantage over the lead smelter; in a general way it may be said that if he keeps the silica in his slag somewhere between 30 and 40 per cent, and provides ample settling capacity, he need worry very little about the other constituents of the slag, and may vary them greatly every day without serious trouble. This makes the matting operation a much simpler, more universal, and more economical process than lead smelting, and fits it particularly for the handling of miscellaneous custom ores of diverse composition.

The variety of pyrite smelting that we are now considering partakes of both of these systems. It demands a care in the ore-mixture, and an exact determination of the composition of the slag that is to be produced, that is, at first, quite irksome to the ordinary copper smelter. On the other hand, it is, with one single exception, more elastic as to the character of the slag that it may produce than any other smelting operation with which I am familiar. The exception referred to is, of course, the fact that the pyrite furnace cannot advantageously produce a basic slag. Unless there is sufficient free silica present to delay the smelting until the desired amount of pyrite is oxidized to ensure the proper degree of concentration (and, incidentally, to combine with the ferrous oxide thus formed), it will not be pyrite smelting; it will simply be a melting down of the charge into a low-grade matte, as has been so many times insisted upon in this review.

However, in the variety of pyrite smelting that I am now considering, this inability to produce a basic slag will very seldom prove an injury. This kind of pyrite smelting deals mainly with dry silicious ores, and every pound of extra silica that the slag will stand means just so much more profit for the smelter. Consequently, the charge is made up to contain the maximum amount of silica that it can carry, and still melt at a temperature that can be produced economically in the furnace. The metallurgist constantly hovers near the danger limit, and, on the whole, finds his most convenient guide not in the per cent of silica that his slag contains, but in the oxygen ratio between the basic and acid constituents of the slag.

Dr. Carpenter in his daring and successful inauguration of the Deadwood & Delaware Smelter in South Dakota relied mainly upon this ratio, and found it a safe guide. He points out[3] that if the slag is kept between 4RO, 3SiO2

[2] This JOURNAL, May 2, 1903, p. 664.

[3] *Transactions*, American Institute of Mining Engineers, Vol. XXX, p. 774.

and RO, SiO_2—that is to say, between a sesquisilicate and a bisilicate—it will generally be satisfactory, alumina being figured as a base. Bretherton, with a much higher per cent of alumina in his ores,. finds that he must figure this substance on the acid side, giving it, however, something like two-thirds the re-placing value of silica.

This is, however, only one of the two points which determine the proper constitution of the slag. The second point to consider is whether —even though the proper ratio between base and acid exists—the bases are of such a nature that the slag will melt at a suitable temperature. These matters belong to the study of slags, and cannot be taken up in this review, except to point out that the presence of at least 10 to 15 per cent of ferrous or manganous oxide is indispensable.

Where proper knowledge and experience are available, this partial pyrite smelting seems to offer the most economical outlet for the vast supply of low-grade silicious sulphide ores and pyritic concentrates, carrying the precious metals, but little copper or lead, the production of which is at present hampered by treatment charges which are higher than a large proportion of these ores can bear.

THE END.

MINERAL PRODUCTION OF AUSTRIA IN 1903.

The following statistics, showing the production of the principal minerals and metals in Austria in 1903, have been compiled by the Minister of Agriculture and recently published in the *Oesterreichische Zeitschrift für Berg und Hüttenwesen.* The production of coal is reported as below, in metric tons, the figures for 1902 being given for comparison:

	1902.	1903.	Changes.
Coal	11,149,935	11,620,275 I.	470,340
Brown coal (Lignite)	22,200,387	22,214,490 I.	14,103

These totals include the production of briquetted coal, which amounted to 165,600 tons in 1902 and 179,133 tons in 1903. There was thus an increase in the output of both varieties of coal. The favorable showing was due to improved conditions of trade and to the settlement of labor difficulties, which were especially prominent in 1902. The increase was reflected to some extent in the output of coke, which amounted in 1903 to 1,168,263 tons, against 1,160,846 tons in the previous year.

The production of iron again shows a falling off, the decrease in pig iron being 22,911 tons, which is only partially counterbalanced by an increase of 1,917 tons in the output of re-melted iron.

	1902.	1903.
Pig iron	831,544	808,633
Re-melted iron	160,282	162,199

Of the principal ores and metals other than those mentioned above the output in 1902 and 1903 was as follows:

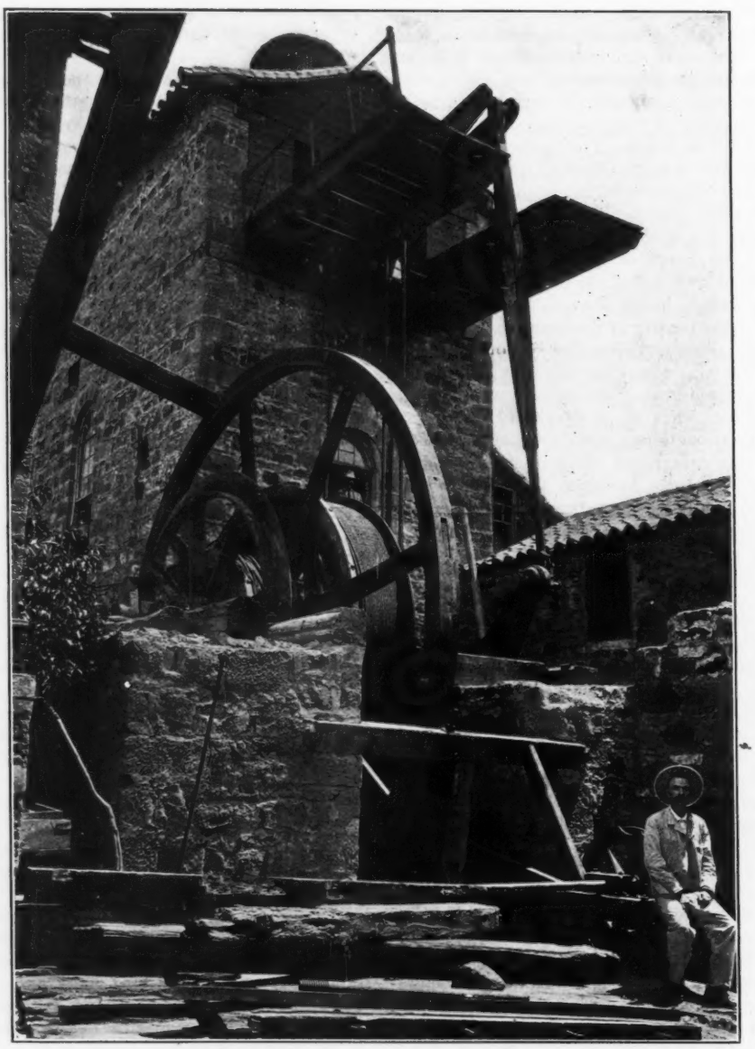
		1902.	1903.		Changes.
Gold	Kg.	7	8	I.	
Silver	"	39,544	39,812	I.	268
Quicksilver	tons	525	523	D.	2
Copper	"	776	961	I.	185
Lead	"	11,264	12,162	I.	898
Spelter	"	7,711	8,532	I.	821
Tin	"	50	34	D.	16
Antimony	"	4	14	I.	10
Iron ore	"	1,744,298	1,715,984	D.	28,314
Pyrites	"	3,720	4,475	I.	755
Manganese ore	"	5,646	6,179	I.	533
Graphite	"	29,527	29,589	I.	62
Asphalt rock	"	897	1,273	I.	376
Mineral paints	"	1,485	1,691	I.	206

This table shows increases in the production of gold, silver, copper, spelter, antimony, pyrites, manganese ore, graphite, asphalt and mineral paints, but decreases in the other substances. In iron ore there was a falling off of 28,314 tons, which marks a continuation of the retrograde movement.

A VETERAN HOISTING ENGINE.

BY E. R. WOAKES.

I send you herewith a photograph of a historic hoisting engine, which may interest your readers, as showing a veteran in service. This engine was installed about 1851 at the great Pozo Ancho mine of the Linares Lead Company, Ltd.—a mine which has produced hundreds of thousands of pounds in dividends, the latest having been in March last. The engine is named "San Juan's," and was the first large hoisting engine erected in the Linares district. It is doing good work to-day, though the shaft is now only an auxiliary one. Sinking operations, however, will soon be begun there, as the company intends to develop that part of the mine in depth, as soon as the new air compressor plant, now under erection, is completed.



A VETERAN HOISTING ENGINE AT LINARES, SPAIN.

This engine is now hoisting an unbalanced skip, carrying a ton of ore, from the eleventh level, a vertical depth of 970 ft. The deepest level in the mine at present is the seventeenth, 1,560 ft. below the surface. The engine, which is of the Cornish type, has a cylinder 20 in. in diameter, with a stroke of 12 ft. The steam pressure is 40 lb., with a jet condenser. The diameter of the rope drum is 10 ft., and the fly-wheel is 20 ft. diameter. The usual speed is 16 revolutions per minute. When no hoisting is going on, the engine is used to drive a pair of Cornish rolls; the crank for making this connection can be seen on the left of the square shaft.

It requires some skill to drive this engine, as it is liable to stick on the center when heavily loaded. We have only one man who can manage it satisfactorily, and it is interesting to watch him helping the old engine at the critical points of the stroke. There is a dial in front of his seat, which shows the exact position of the crank; keeping his eye on this dial and hands on the valve-wheels, he manipulates the valves just before each dead-point is reached.

No doubt you will say that this old masterpiece has outlived its time; that it has no place in modern mining and ought to have been on the scrap-heap thirty years ago. Probably the veteran will have to go soon; but I, for one, shall be sorry to part with such a faithful old servant, and to destroy a link with the past.

IRON IN SWEDEN.—A new syndicate is making efforts to erect large blast furnaces at Nyköping, in Sweden, for the making of pig iron. It is intended to use Gellivare iron ore and charcoal.

THE COMMERCIAL WET LEAD ASSAY.

H. A. Guess, in a paper to be presented at the Lake Superior Meeting of the American Institute of Mining Engineers, refers to certain defects in the generally used ammonium molybdate method, these being especially the faintness of the end reaction and the difficulty of determining the precise point, particularly in the case of low-grade ores, and the interference of lime. In the effort to devise a more satisfactory method, the following was developed and has proved quite successful in a long series of trials.

The lead in the ore is converted into sulphate, which is taken into solution as acetate by digestion with ammonium acetate. The solution of lead acetate is filtered off and the lead precipitated as chromate by an excess of standardized potassium chromate. The precipitate is filtered off and washed, the filtrate acidified with about 25 c.c. dilute chlorhydric acid (1:1), about 0.5 g. of potassium iodide added, and the liberated iodine titrated with a standardized solution of sodium hyposulphite, running in the 'hypo' until the brown color of the iodine is almost discharged. Then a few drops of starch paste are added, and the titration is continued until the blue color is just discharged and a clear solution remains.

The potassium chromate solution is made up with 9.4 grams per liter, of which 1 c.c. will precipitate 10 mg. of lead. The solution of hyposulphite is made up with 36 grams to the liter, of which 1 c.c. equals 1 c.c. of the chromate solution.

The only element that is likely to interfere is antimony, which may cause the results to be slightly low, because of the imperfect solubility of lead sulphate in slightly acid ammonium acetate in the presence of the residual mixture of antimony oxides. This difficulty is rectified by prolonging the digestion of the filter and its contents, and using slightly ammoniacal ammonium acetate for the digestion. The solution is then slightly acidified by the addition of acetic acid after dilution and before adding the chromate.

In dealing with fair percentages of lead, the exact quantities of ammonium acetate and water are not of great importance, but when only about 1 per cent of lead, or less, be present, it is necessary to keep the bulk of the strong ammonium acetate within 10 c.c. and dilute with cold water to a bulk not exceeding 50 c.c., before adding the chromate. In practice the method takes about the same time as the molybdate method.

A shorter method, adapted to the assay of calcareous lead ores, consists in digesting 1 to 5 grams of the sample in a 250-c.c. flask with 3 to 5 c.c. of nitric acid, and 15 c.c. of strong chlorhydric, until everything is in solution and the excess of acid has been reduced to about 8 c.c. The flask is then removed from the hot plate, and slightly dilute ammonia added slowly in small excess. Acetic acid of 80 per cent strength is then added slowly, the flask being shaken vigorously, until its smell indicates an excess of acetic acid. Then 5 c.c. of strong ammonium acetate is added to insure the solution of any lead compounds remaining undissolved. If the ore contains no antimony, or separated gelatinous silica, and if the silicious residue in the bottom of the flask is only in small amount, add to the hot, undiluted and unfiltered solution an excess (about 10 c.c.) of a 10 per cent chromate solution. Under these conditions the bulk of the contents of the flask will not exceed 50 c.c. After shaking and allowing the precipitated lead chromate to settle for about five minutes, it is filtered off on an 11-cm. paper. The lead chromate will be quite granular and will show no tendency to run through. After thorough washing with hot water containing about 0.5 per cent of acetic acid, the funnel with its filter is set over the original flask and hot dilute chlorhydric acid (1:1) is poured through to dissolve the lead chromate. To the solution in the flask is added 0.5 to 2 grams of potassium iodide, and titration is then made directly with hyposulphite solution, which is preferably made up so that 1 c.c. equals 5 mg. of lead. By using only a small quantity of potassium iodide and having the solution fairly strong with acid (about 50 c.c. of 1:1 HCl in a total of 200 c.c. of solution) and somewhat warm, any tendency of lead to form yellow scales of lead iodide, and thus somewhat obscure the end reaction with starch, is completely checked, and the end-reaction has the same sharpness as in the back titration of the originally described sulphate-chromate method.

The modified method does not consume for heavy lime ores more than one-half the time of the sulphate-chromate method. Its accuracy has been thoroughly tested. It is, however, inapplicable in the presence of antimony, or of considerable amounts of bismuth or silver, and for silicious ores is less expeditious and satisfactory than the sulphate-chromate method.

HARDENING IRON.—According to the London *Engineer*, a new process for hardening iron has been developed by two Prussian inventors. It consists in adding to iron a small percentage of phosphorus combined with a large amount of carbon. The iron is heated in a tempering powder consisting of bone dust, to which are added 300 grains yellow prussiate, 250 grains cyanide of potassium, and 400 grains of phosphorus. The receptacle is closed and luted with clay, and raised to a clear red or white heat. The material treated is then taken out and plunged, while still hot, into a warm bath. It is claimed that this will harden the surface of a piece of iron weighing 400 lb. to a depth of about 0.04 in., and that the iron can neither be cut nor chipped by the best steel used, and that it can be readily welded.

BLAST-FURNACE FLUE DUST.—According to Mr. E. A. Uehling, briquetting the flue-dust from iron blast furnaces has not proved commercially successful. Filling it back into the furnace, as fast as produced, is largely practiced with varying and, on the whole, indifferent success. The difficulties arising from the use of a large percentage of fine ores in the mixture are very materially aggravated by filling back the flue-dust. Hence the problem of treating the latter so that it can be utilized without serious difficulty still remains unsolved. Since in American practice from 2 to 5 per cent of the burden, depending on the percentage of Mesabi and other fine ores in the mixtures and also on the size and condition of the furnace, is blown over, the solution of this question is of vast importance. It has been proposed to mix the dust with a sufficient proportion of pulverized slag, and expose the mixture to a temperature high enough to melt the latter, thus agglutinizing the mixture. Mr. Uehling believes that with the proper means the dust can be agglutinized by hot molten slag direct without the aid of external heat, with greater probability of commercial success.

PRESENT PRACTICE OF CYANIDATION IN THE BLACK HILLS—I.

By WILLIAM MAGENAU.

The tables giving details of Black Hills practice, with the observations to follow, are intended to afford a comprehensive idea of the present development of cyanidation in this important mining region. The technical features are set forth in detail, all the data being calculated in ratios which facilitate comparisons between mills of different capacities and different systems of treatment. Such comparisons are especially interesting between the wet and dry crushing plants, which are running side by side on similar ores, and with keen rivalry. In the tables, the mills coming under this comparison are B, C, D, E, F and G of the wet crushing (in cyanide solution), and H and J of the dry crushing. K and L crush dry, but treat ores of a different character, which are exceptionally amenable to cyanidation, and require only coarse crushing.

Mill A is the great plant of the Homestake Mining Company; the practice there has been described by Mr. C. W. Merrill, the designer and superintendent[1]. My figures are from revised and additional data which Mr. Merrill himself kindly provided. In the interim, improvements in the practice at this plant have achieved a result even better than the former record of 35c. per ton, the present cost being slightly less than 30c. The saving made is chiefly in consumption of cyanide. This application of the cyanide process to a rather discouraging material (exceedingly fine amalgamation tailings containing some 8 per cent of partially altered iron sulphides), has been one of its notable successes, fostered, as it has been, by admirable metallurgical and mechanical skill, and resources such as only a great mine and liberal management can provide.

The fundamental factor in securing a leachable material has been the provision of ample and carefully designed appliances for eliminating the slime, the equipment consisting of a series of sheet iron cones, arranged in batteries and in steps, so that one battery takes the apex product from that above. The last of four such steps consists of cones provided with an upward current of water; these cones also are smaller and have steeper sides than the preceding. The dimensions are given in the tables.

This cone system of classification has been adopted throughout the Black Hills in mills of the wet crushing type, displacing the old pointed boxes. There can be no doubt that a cone, from its perfectly symmetrical shape with reference to the entering stream of pulp (which is introduced through a small vertical cylinder extending to the cone's volumetric center) will suffer the least disturbance from eddies, and hence give the best results. Ratios of cone volume to tonnage, etc., are discussed in another place[2].

Cyanide plant No. 2 of the Homestake Company, treating 700 tons sand per day, has not been included in the tables, since it is essentially similar to their plant No. 1.

The mills are undergoing constant change; therefore many of the figures in these tables

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[1] *Transactions*, American Institute Mining Engineers; also this JOURNAL, March 7, 1903.

[2] The writer is indebted to the mill superintendents of the district, whose uniform courtesy and readiness to give information of general interest, it is a pleasure to acknowledge. Access has also been had to the interesting and complete data recently compiled by Mr. John Gross, superintendent of the Penobscot mill, covering detailed costs and technical results of probably the best designed and one of the most carefully operated wet crushing mills in the district.

TABLE I-EQUIPMENT

CYANIDE MILLS OF THE BLACK HILLS

South Dakota
April, 1904

			CRUSHING			SEPARATION				SANDS TREATMENT			SLIMES TREATMENT		SOLUTION TANKS								PRECIPITATION			
			Mill Capacity Tons per 24 hours	Rock Breaker	No. of Stamps (or Rolls)	Number and size of Gravity Cones (without upward current)	No. cu. ft. Gravity Cone Vol. per ton of Mill Capacity	Number and size of Cone Classifiers (with upward current)	No. cu. ft. Classifier Volume per ton of Mill Capacity	Number and Size of Sand Tanks (diam x height)	Tons capacity each Tank	Tons total sand tank capacity per ton sands treated per day	Number and Size of Slimes Tanks (diam x height)	Cu. ft. total Slime Tank vol. per ton Slimes treated pr day	No. and Size Solution Storage Tks. (diam x ht) (Above leaching tanks)	No. tons total Sol. Storage per ton of Mill capacity	No. and Size Solution Sump Tks (For slimes decantations) (diam x ht)	No. tons total Sol. Sump per ton of Mill Capacity	No. and Size Gold Sol. Tanks (Above Zinc Boxes) (diam x ht)	No. tons total Gold Sol. Tanks per ton of Mill Capacity	No. and Size Barren Sol. Sump Tks (Below Zinc Boxes) (diam x ht)	No. tons total Barren Sol. Tks per ton of Mill Capacity	Number and Size of Zinc Box Compartments (or bbls)	Total Cu. Ft. Zn Shavings (Net)	No. cu. ft. Zn Shavings per ton of Mill Capacity	No. cu. ft. Zn Shavings per ton Sol. precipitated pr day
WET-CRUSHING PLANTS	Sands Plant	A Homestake Cyanide No. 1	2160 Note a	Large gyratories at Shafts Break to 4"	540	Sixteen 10 ft Eighteen 7 ft diameter APEX - 80°	1.63	Twenty Four 42" diam. APEX - 60°	.11	Fourteen 44 x 9 (inside)	610	6.0	Slimes not treated		One 44 x 9 (inside)	0.31 Note c	Two 26 x 19 (inside)	0.43 Note c	Two 26 x 19 (inside)	0.43 Note c	One 44 x 9 (inside)	0.31 Note c	Zinc Dust 24-frame Frames 36"	used. Two Presses. X 36" X 4"		
	Treating both sands & slimes	B Horse-shoe	300 Note b	Two No. 5 Gates Gyratory	120 Note b	Eight 50" diam. APEX - 60°	.42	Four 50" diam. APEX - 50°	.27	Eight 40 x 5	250	8.3	Sixteen 20 x 10 Two 30 x 14	253	Two 30 x 14	2.1	Six 24 x 10	2.9	Eight 15 x 10	1.5	Two 24 x 10	0.9	150 Round Iron Barrels 24" x 24"	728	2.4	.73
		C Penobscot	110	One Blake 13 x 24	40	Two 42" diam. APEX - 50°	.21	One 42" diam APEX - 50°	.11	Six 30 x 6	140	15.3	Eight 24 x 12	638	Three 16 x 16	2.5	One 20 x 10	0.8	One 20 x 10	0.8	One 20 x 10	0.8	32 comps. 30" x 24" x 20" and 11 barrels	265	2.4	.59
		D Dakota	110	One No. 4 Gates Gyratory	30	One 36" d. One 50" d. APEX - 46°	.28	One 42" diam APEX - 50°	.11	Four 20 x 10	115	6.4	Six 20 x 12	255	Two 16 x 12 One 10 x 8	1.4	Two 20 x 8	1.3	One 10 x 6 One 6 x 3	0.14	Two 16 x 6	0.6	47 Wooden Barrels	166	1.5	.60
		E Columbus	70	One Blake 18 x 22	20	One 54" dia. 60" deep APEX - 60°	.48	One 40" diam APEX - 60°	.12	Eight 16 x 6	65	10.5	Five 16 x 8 Two 12 x 8 Two 10 x 8	180	Three 12 x 8	1.1	Two 10 x 8	0.5	One 6 x 4	0.04	One 14 x 6 Note f	0.4 Note f	14 Wooden Barrels	53	.76	.35
		F Dorr	80	One No. 4 Gates Gyratory	One Roll 14 x 30 Chilean Mill - 6 ft	One 50" diam APEX - 50°	.25	One 50" diam APEX - 50°	.25	Four 18.5 x 10	100	8.3	Cone 22 ft Three Moore Tank Comps. 14 x 7 x 6	20	Two 16 x 12 One 10 x 8 One 6 x 6	2.0	None	—	One 10 x 3	0.08	One 16 x 8	0.6	24 Wooden Barrels	90	1.1	.60
		G Hidden Fortune	275	One Blake 15 x 30	60	Three 84" diam APEX - 50°	.90	Three 40" diam APEX - 60°	.09	Five 40 x 6.5	350	9.0	Five 12 x 16 Three 24 x 16	468	Two 20 x 16	1.0	One 24 x 12	0.6	Three 12 x 8 (Filters)	0.28	Two 30 x 8	1.2	Steel Boxes	308	1.1	.82
DRY-CRUSHING PLANTS	Fine	H Imperial	100	One Blake 10 x 20	Four Rolls 16 x 36	No separation				Four 40 x 6	275	11.0	Slimes treated with Sands		Two 14 x 16 Note d	1.4 Note d	None		Two 20 x 4 Note d	0.7 Note d	Two 20 x 4 Note d	0.7 Note d	10 comps. 24" x 24" x 24"	60	0.6	.92
		J Golden Reward	160	One No. 3 Two No. 2 Gates Gyr.	Five Rolls 15 x 26	Do.				Twelve 35 x 6	150	11.2	Do.		Five 17 x 14 Note e	2.5 Note e	Do.		Eight 10 x 6 Note e	0.7 Note e	Three 10 x 6 Note f	0.3 Note f	54 Wooden Barrels	202	1.3	1.20
	Coarse	K Spear-fish	200	One Blake 10 x 20	One Roll 16 x 36 One Roll 14 x 27	Do.				Ten 26.5 x 7	130	6.5	Do.		Two 20 x 10	0.9	Do.		Two 20 x 7	0.6	Two 18 x 8	0.6	21 comps. 24" x 36" x 18"	147	.73	.64
		L Wasp No. 2	120	One No. 3 Gates Gyratory	Two Rolls 14 x 24	Do.				Four 16 x 7 One 24 x 7	55 100	2.6	Do.		Two 10 x 10	0.4	Do.		Two 10 x 6	0.2	Two 10 x 6 Note f	0.2 Note f	11 Wooden Barrels	42	.35	.58

Note a. This is the tonnage of the Amalgamation Plants from which sands are derived. The sands treated by the Cyanide Plant amount to 1450 tons per day.
" " b. Only 70 of the 120 stamps are now in use, owing to insufficient tankage for slimes treatment
" " c. Note that these ratios are based on sands tonnage, and are not comparable with other wet-crushing figures in same column, which are based on sands + slimes.
" " d. Solution tankage in this mill was provided for double the tonnage of ore, and is therefore excessive on present basis.
" " e. Solution tankage in this mill was provided for a special process now discarded, and is therefore excessive on present basis.
" " f. This proportion of Sump Tankage is found to be inconveniently small.

TABLE II-METALLURGICAL PRACTICE

CYANIDE MILLS OF THE BLACK HILLS South Dakota April 1904

			CRUSHING										SEPARATION	SANDS TREATMENT			SLIMES TREATMENT			SOLUTIONS				PRECIPITATION						CONSUMPTION OF CHEMICALS				
			Wt. of Stamps, lbs.	Drop in inches	Drops per minute	Height of Discharge-Inches	Mesh Opening-Inches	Meshes per lineal inch	Size of Wire W&M Gauge	Tons solution used in Battery per ton of ore crushed	Character of Ore (See Text)		Ratio (dry weight) Sands : Slimes	No. of hours contact with Solution and Washwater	Tons Sol. per ton of Charge including Sol. used in Battery	Tons Washwater per ton of Charge	No. of hours contact with solution and Washwater	Tons sol. per ton of Slimes including Sol. used in Battery	Tons washwater per ton of Slimes	Total tons Solution in Mill	No tons Sol. to Mill per ton of Mill Capacity	Strength of Leaching Sol. in KCy (lbs per ton)	Protective Alkalinity of Sol.= cc's $\frac{N}{10}$ H_2SO_4 to 10 cc Sol.	Total tons of Sol. precipitated per 24 hrs	Tons Sol. precipitated per ton of Mill capacity	Gold Value of Sol. entering Zinc boxes ($ per ton)	Gold Value of Sol. leaving Zinc boxes ($ per ton)	% (Au+Ag) (dry) in Products removed from zinc Boxes	Ratio in Bullion Au : Ag (by wt)	Total Loss of KCy per ton of Ore (lbs)	Consumption of Zinc per ton of Ore (lbs)	Consumption of Zn per ton of Sol. precipitated (lbs)	Consumption of Zn per oz of Bullion produced (lbs)	Consump. of Burnt Lime per ton of Ore (lbs)
WET-CRUSHING PLANTS	Sands Plant	A Homestake Cyanide No 1	900	10.5	88	10	.022	Punched Needle Slot No 8	Water 0 to 10	Hornblende Schist with Qtz & Pyrite			65:35	80	1.0 Note k	0.4	Slimes not treated			3500 Note j	2.5 Note j	2.8 and 1.5	1.0	500 Note j	0.36 Note j	3.50	.02 to .08	7	75:25	0.4 Note j	.07 Note j	.20	0.9	3 to 5 Note j
	Treating both sands & slimes	B Horse-shoe	1000	8.0	90	8	.084	8	19	6 to 8	Sil. and Qtzite		80:20	80	6.6 to 8.6	0.3	180	10 to 12	1.0	4000	13.3	1.5	— Note m	1000	3.3	1.70	.10	10	55:45	0.7	1.5	.45	3.3	6
		C Penobscot	910	7.5	97	6	.02 x .059	26 x 13 Note g	26	4.5	Sil.		50:50	384	14.0	0.1	120	11.0	1.0	1600	14.5	1.2	0.5	450	4.1	1.75	.10	20	50:50	1.2	1.3	.32	2.2	6
		D Dakota	850	8.5	90	4	.065	10	20	5	Sil.		65:35	120	6.5	0.15	107	8.6	0.6	475	4.3	2.2	1.0	275	2.5	1.80	.16	30	65:35	0.6	0.6	.24	1.3	5.3
		E Columbus	850	8.3	98	5	.046	14	23	7	Sil. Wellax.		70:30	200	12.0	0.6	96	10.0	1.3	250	3.6	1.6	1.6	150	2.1	2.00	.07	15	65:35	1.0	0.6	.28	2.5	5
		F Dorr	1 Set Coarse Rolls 14 x 30 1 Chilean Mill 6 ft diam				.046	— Note m		— Note m	Sil.		60:40	— Note m		0.15	— Note m	3.0 besides crushing Solution	0.3	300	3.7	2.0	2.0	150	1.9	300 to 5.00	.04 to .20	— Note m	34:66	0.7	0.5	.26	0.7	5 to 8
		G Hidden Fortune	1050	8.0	94	5	.033	16	22	5	Qtzite and Cement		71:29	144	7.0	0.4	108	8.5	1.5	1760	6.4	1.4	— Note m	375	1.4	— Note m	.02 to .06	— Note m		0.8	0.4	.30	— Note m	4.5
DRY-CRUSHING PLANTS	Fine	H Imperial	1 set Coarse Rolls 16 x 36 3 sets Fine Rolls 16 x 36				.030	16	21	No solution used in crushing	Qtzite		No separation made	200	0.4	0.25	Slimes treated with Sands			300	30	5.0 and 3.0	1.5	65	0.65	Variable Rough Av $22	.05 to .10	20	85:15	0.35	0.6	.92	1.2	5
		J Golden Reward	2 sets Coarse Rolls 15 x 26 3 sets Fine Rolls 15 x 26				.100	6 Notch	16		Sil. and Qtzite			250	0.75	0.25				900	5.1	4.0 and 2.5	0.6	168	0.96	2.00 to 15.00	tr.	50	40:60	0.6	0.6	.62	0.75	9
	Coarse	K Spear-fish	1 set Coarse Rolls 16 x 36 1 set Fine Rolls 14 x 27				.250	3	14		Silic. Lime			94	1.0	0.15				618	3.1	7.0 and 4.2	1.2	228	1.14	2.00 to 5.00	tr.	30	100:0	0.8	0.5	.40	2.5	4.6
		L Wasp No 2	1 set Coarse Rolls 14 x 24 1 set Fine Rolls 14 x 24				.380	2	11		Sil. and Qtzite			44	1.25	0.25				96	0.8	5.0 and 2.5	0.75	72	0.60	2.00 to 20.00	.04 to .10	50	Variable 30:70	0.5	0.3	.50	1.0	6

Note g This is a special screen made by W.S. Tyler Co. and has two different meshes at right angles, the result being an oblong opening. Practically equivalent to 26 mesh.

" h Mesh at this mill is varied from 4 to 10 according to moisture in ore treated. As screens are flat stationary, set at 50°, usually 97% of product will pass 20 mesh screen.

" j Note that these ratios are based on sands tonnage, and are not comparable with other wet-crushing figures in same column, which are based on sands + slimes tonnage.

" k No cyanide solution used in battery at this plant.

" m Dashes signify "information not available."

represent a transition period; they represent the recent practice at each mill. Some of them, as B, F and G, have been running so short a time that the procedure has hardly passed the experimental stage, and changes are to be expected.

Crushing Table I.—The figures giving mill capacity are based on tons of 2,000 lb., dry weights, per 24 hours. For the purpose of comparing metallurgical data I have eliminated factors exterior to the mill, such as ore shooting, etc.; and the figures represent what the mills can regularly handle, with the tankage, bulks of solution, etc., given elsewhere.

As regards rock breakers, the practice is about evenly divided between jaw crushers of large opening and the rotary or gyratory type. In general, the Black Hills ores are broken easily; some of them remarkably so.

It should be noted that the 540 stamps supplying mill A are in three units; two batteries of 200 each and one of 140. As will be seen, a stamp duty of from 2.75 to 4.38 tons per 24 hours is obtained; 3.5 to 4 is a common figure, indicating that the ores crush readily, notably at the Homestake, where not only a fine screen, but high discharge is used. The narrow type of mortar is in general use. At several mills, double discharge mortars were installed, but could not be used with cyanide solutions, which cannot be handled in the large amounts necessary to give free discharge to a double set of screens. In all cases, the rear screens have been closed up, and the mortars run with front discharge only. Mill F uses a Monadnock Chilean mill with good results. In the dry crushing plants, Cornish rolls of the high speed type are used. The large capacity of the rolls in mills K and L will be noted. Not only is their product coarse (especially at K), but it is remarkably brittle, and carries just enough moisture to crush well. Mills H and J dry their ore in rotary furnaces before feeding it to the finishing rolls.

THE BROKEN HILL MINING INDUSTRY IN 1903.

In the Broken Hill district in New South Wales there were 12 mines in operation during the year 1903, which raised 1,078,442 long tons of sulphide ore, removed 195,969 cu. yd. of material from open cuts, and filled 270,254 cu. yd. into depleted stopes. They used 13,364,399 superficial feet of timber, 330,385 lb. of explosives, 433,089 detonators and 57,030 coils of fuse, the total value of explosives, including fuse and detonators being £21,926. The consumption of coal was 70,644 tons. The aggregate of engines was 10,456 h. p., and of boilers 9,300 h. p. The total value of plant on the mines was £620,487. The consumption of explosives per ton of ore raised was about 0.3 lb.; of timber, about 12.5 ft.; of coal, about 0.07 ton. The total number of men employed at the end of the year was 5,626.

From 1,100,514 tons of ore raised there were obtained the following profitable products:

Galena concentrates, 203,416 tons, containing 5,438,498 oz. silver, 2,135 oz. gold, 117,078 tons lead and 17.063 tons zinc. Average grade = 26.7 oz. Ag. per ton; 57.5 per cent Pb; 8.4 per cent Zn.

Oxidized ore, 22,072 tons containing 895,681 oz. silver, and 4,065 tons lead.

Slimes, 61,498 tons, containing 1,103,350 oz. silver, 11.654 tons lead, and 10,035 tons zinc.

Zinc concentrates, 21,634 tons, containing 295,416 oz. silver, 2,606 tons lead, and 8,385 tons zinc. Average: 13.7 oz. Ag per ton, 12 per cent Pb and 38.8 per cent Zn.

The total amount of the profitable products was 308,681 tons; while 826,497 tons of slimes, middlings and tailings, containing 5,029,466 oz. silver, 52,075 tons lead and 148,516 tons zinc were either dumped on the surface, with a view to possible future treatment, or were returned to the mine as filling.

The 1,100,514 tons of ore raised comprised 22,072 tons of oxidized, and 1,078,442 tons of sulphide. The latter contained 11,867,157 oz. silver, 183,416 tons lead and 184,011 tons zinc. The average grade of the sulphide ore was therefore about 11 oz. silver, 17 per cent lead and 17 per cent zinc.

COPPER DEPOSITS OF CENTRAL NEW JERSEY.

According to notes by Mr. Walter Harvey Weed, in 'Bulletin 225' of the United States Geological Survey, the Griggstown copper mine is located in the hilly tract north of Princeton, N. J., about 8 miles from that city. The trap ridges, locally known as Tenmile Mountain and Rocky Hill, are cut through by Millstone river, the principal tributary of the Raritan, and excellent exposures are seen near the village of Rocky Hill. The copper property is about three miles north of this place, on the open, smooth, cultivated fields on the east side of the river, at an elevation of about 200 ft. above the sea. It was worked early in the last century, and then lay idle for a long period. A few years ago it was cleaned out and re-opened by the present owners, but no copper has been produced lately. The workings consist of several vertical shafts, now caved in, a drain tunnel 1,200 ft. long, and a new incline shaft, together with stoped-out chambers. The main vertical shaft is said to be 150 ft. deep, but is filled with water to the level of the old drain tunnel, and the workings at present accessible are all above this point.

The deposit consists of an ore seam varying from an inch to a foot or more in thickness. The ores are native copper, red oxide of copper (cuprite), black, glassy-looking tenorite (black oxide of copper), malachite, chrysocolla, copper glance, and rarely bornite. The ore seam also carries considerable micaceous hematite. These minerals occur in leached and white altered hornstone. The unusual conditions of occurrence noted in this deposit make its scientific interest considerable.

CHEMICAL ANALYSIS OF KUNZITE.—The new mineral, kunzite, found near Pala, San Diego county, California, possesses properties that make it of more than ordinary scientific interest in addition to its value for gem purposes. As is generally known, kunzite is a variety of spodumene, but differs from the latter in the activity displayed before ultraviolet light. In the issue of the *Journal of Science* for July, 1904, a complete analysis of the mineral is published by R. O. E. Davis of the University of North Carolina. The analysis was made from a selected deep lilac-colored crystal, and may be regarded as typical for the mineral. It shows the following percentage composition: SiO_2 64.05; Al_2O_3 27.30; NiO 0.06; MnO 0.11; ZnO 0.44; CaO 0.80; K_2O 0.06; Na_2O 0.30; SiO_2 6.88; loss (ignition) 0.15; total 100.15.

On account of the peculiar properties of the mineral, tests were made for the rarer elements; they showed, however, that there was no zirconium, thorium, or earths of the cerium and yttrium groups present.

COPPER SMELTING AT MANSFELD.*

Mansfeld in Germany has been the seat of copper mining for over 700 years. During this long lapse of time it has experienced great vicissitudes, but despite of them it has grown from insignificance to one of the largest enterprises of its kind in the world. Under the patronage of the Counts of Mansfeld, the industry attained a high state of development in the 14th and 15th centuries, only to be checked and all but extinguished by the Thirty Years' War. A second period of activity was inaugurated in 1671, when the rights to work the mines were declared free. The extension of this privilege created the system of small independent enterprises by which operations were carried on with variable success down to the middle of the last century. In 1852 the present company, the Mansfield Kupferschieferbauenden Gewerkschaft, was formed as a consolidation of the various mines and smelters; since then the industry has expanded enormously, and it is now on a solid and profitable basis. From 1861 to 1902 the annual output of copper has increased from 1,485 tons to 18,749 tons, and the output of silver from 8,000 kg. to 95,500 kg.; while the number of employees in the mines and works has grown from 4,672 to 19,883.

The copper deposit mined in the Mansfeld district consists of a stratum of bituminous, black, marl shale interbedded in the *Zechstein* formation. The bed shows great persistence, and is developed throughout the whole area of the basin occupied by the stratified rocks. It averages from 7 to 10 cm. of pay ore, reaching 17 cm. as a maximum. The copper and silver sulphides are distributed as finely divided particles uniformly throughout its mass. In the Mansfeld district proper, that is, between the towns of Gerbstedt and Eisleben, the ore carries from 2 to 3 per cent. copper, and about 5 kg. of silver per ton of metallic copper.

The reduction works comprise a number of independent plants; there are four smelters for treating the raw ore, two roasting works with sulphuric acid plants, two matte smelting works, besides a desilverizing plant, two furnace refineries and one electrolytic refinery. The company also operates its own machine and repair shops, which are fully equipped for making and repairing all apparatus used in the mines and smelters.

The ore from the mines is transported to one of the four smelters situated at Eisleben (Krughütte), Helbra (Kochhütte), Leimbach (Eckardthütte) and Hettstedt (Kupferkammerhütte), where it is heap roasted and smelted in shaft furnaces to crude matte.

The roasting process, which has for its object the removal of the bituminous matter and carbon dioxide, is carried out in the open. The ore is piled in heaps measuring 60 m. long, 5.5 m. broad at the bottom, and 3 m. at the top, and from 1.5 to 1.75 m. high. A little brushwood laid around the edge of the heaps serves to kindle the fire, after which the roasting is carried out by combustion of the bitumen. The roasting lasts from four to six weeks, according to the size of the heaps. If the ore contains any quantity of fines it is screened, the latter being briquetted and added to the roast heaps. By roasting the ore loses

*Translated from an article appearing in *Metallurgie*, June 8, 1904

from 8 to 20 per cent of its weight. The raw ore has the following composition:

	Per cent.		Per cent.
SiO_2	29 to 39	Fe	1 to 3
Al_2O_3	11 to 16	Cu	2.8 to 3
CaO	11 to 15	Ag	0.01 to 0.02
MgO	2 to 5	S	2 to 5
CO_2	77 to 13	Bitumen	10 to 17

The ore also contains small quantities of zinc, lead, manganese, nickel and cobalt.

The roasted ore has the following approximate composition:

	Per cent.		Per cent.
SiO_2	49 to 53	CaO	10 to 18
Al_2O_3	15 to 18	MgO	3 to 5

From the roast heaps the ore is carried in cars to the smelters. At the four smelting works the number of furnaces in operation during 1903 was as follows: Krughütte, 4; Eckardthütte, 2 to 4; Kochhütte, 4; Kupferkammerhütte, 3. The furnaces are of the circular shaft type and are usually furnished with forehearths. With the exception of the Kupferkammerhütte, where hot blast is used in part, all of the furnaces operate with cold blast supplied by steam-driven air-compressors. The four smelting works treated 686,354 tons of ore in 1903, turning out 49,179 tons of crude matte, with an average recovery of 28.19 kg. copper and 0.156 kg. silver per ton of ore. The consumption of coke amounted in all to 132,512 tons or an average of 199 kg. per ton of ore smelted.

In addition to the above, one furnace at the Eckhardthütte is operated on the leady flue-dust produced in smelting the shale. The output of this furnace in 1903 was 291 tons silver-lead, 235 tons crude matte and 6 tons nickel speiss, recovered from 2,050 tons of dust.

An important feature of present practice is the utilization of the slag from the furnaces, whereby it is made into bricks, paving blocks, and other forms. The following analysis shows the composition of typical slag:

	Per cent.		Per cent.
SiO_2	47.65	Fe	4.38
Al_2O_3	17.90	CuO	0.21
CaO	16.17	Cu	0.17
MgO	3.26	ZnO	2.14
FeO	5.60	Zn	1.72
		Alk	5.01

For roasting the crude matte, there are two plants provided with kilns and sulphuric acid chambers. One plant (Eckardthütte) has 72 kilns and a system of five lead chambers, and the other (Kupferkammerhütte) has 82 kilns and six lead chambers. At the latter plant there is also a Herreshoff furnace. The roast product of the two plants in 1902 was 49,190 tons. The average daily charge of matte per kiln ranged from 1.07 to 1.40 tons per day. The total production of sulphuric acid of 50° B. for the year was 2,212 tons.

The roasted matte, to which is added from 5 to 10 per cent of unroasted matte, is smelted in reverberatory furnaces to metal containing 75 per cent copper and from 0.4 to 0.45 per cent silver. This process has to be conducted with care. If the molten charge shows traces of copper or foams on stirring the desulphurization has been carried too far, and a quantity of unroasted matte is added to the charge. On the other hand, if it shows too low concentration, metallic copper from previous smelting may be added, or else the charge is tapped, mixed with richer matte and again smelted. When of proper quality the matte from the second smelting, or 'white metal,' has a dull gray color. Its specific gravity ranges from 5.76 with 74 per cent copper, to 5.80 with 75 per cent copper. The slag contains from 9 to 15 per cent copper in the form of cuprous oxide, and is returned to the shaft furnaces. The 20 reverberatories at the two works concentrated 46,562 tons of roasted matte in 1903, producing 25,513 tons of white metal. The matte produced from the second smelting is broken to a coarse size by hand, and then finely pulverized in a ball mill, after which a sample is taken and assayed for copper and silver.

The desilverizing of the copper matte is carried out according to the Ziervogel method, the principle of which depends upon roasting the matte, thereby converting the iron and copper into sulphates, decomposing them to oxides, and finally obtaining the silver in the form of sulphate. The latter is then dissolved out by water, and the solution run over metallic copper, thus precipitating the silver as cement, which is pressed into small cakes and melted in graphite crucibles. The silver bars produced average 999 or above in fineness. In 1903, 24,297 tons of matte were desilverized for a yield of 97,358 kg. fine silver.

The desilverized product, which contains the copper in the form of oxide, is then smelted in reverberatories at the Gottesbelohnunghütte and refined at the Saigerhütte and Kupferkammerhütte. At the former works there are 10 reverberatories, while the refining plants comprise two shaft furnaces and four reverberatories. The charge for the reverberatories consists of 10 tons copper oxide and 10 per cent fine coal. From four to five reverberatories are maintained in constant operation. No details are available as to the methods used in refining the copper.

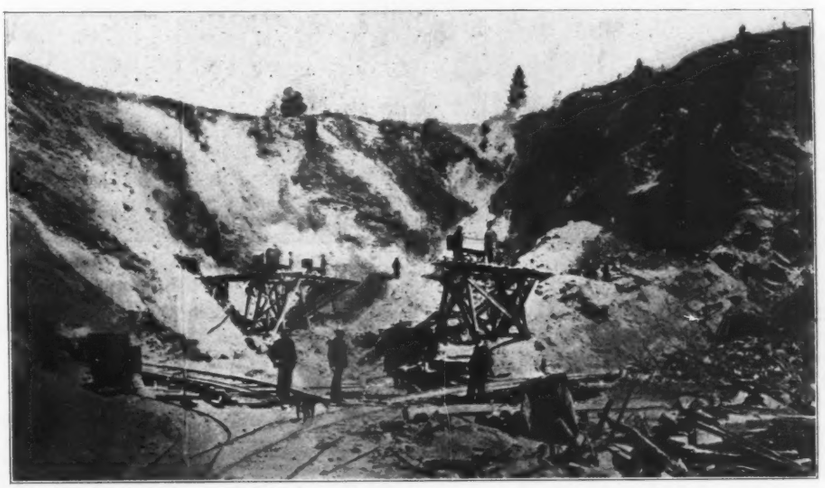
The company operates its own coal mines and coke ovens, which supply all the requirements of the mines and smelters, besides furnishing large quantities of coal to the trade.

EFFICIENCY OF BELT CONVEYORS.—E. Farrar, in *Journal* of the Mechanical Engineers' Association of the Witwatersrand, May, 1904, p. 269, stated that a belt conveyor carrying 142,800 lb. per hour a horizontal distance of 199 ft., raising the load 48.5 ft., required 8.11 h. p., thus showing a mechanical efficiency of 43.12 per cent without taking into account motor losses or the power to transport the load horizontally. Another conveyor, transporting 84,000 lb. per hour through a height of 40 ft. required 4 h. p., showing an efficiency of 42.42 per cent, again neglecting the horizontal transmission.

THE BIG INDIAN MINE AND MILL.

BY OUR SPECIAL CORRESPONDENT.

The Big Indian Mining Company owns an area of 480 acres of mineral ground, 4.5 miles southeast from Helena, Montana, containing an ore-zone striking east and west through a granite country, but near the contact of the granite with lime. The ore consists of quartz and granitic material, associated with hornblende, all carrying free gold. The ore occurs more as a bed or deposit than as a lode, and the mining here is largely a quarrying proposition. There are open cuts from which the blasted ore is shoveled into cars and taken to the mill; and in other places there are pits into which the ore is broken down from above, and let down from the pits through chutes to loading levels below, which lead out to the mill. By this method the work proceeds against a face of ore 80 ft. high and 400 ft. in width. An adit, now in 900 ft., will be driven 800 ft. farther to cut the main ore-body 400 ft. below the lowest pit.



BIG INDIAN MINE, NEAR HELENA, MONTANA.

The ore runs from $2 to $2.50 gold per ton, and Frank B. Heardt, manager of the property, states that the average cost of mining and milling does not exceed 47c. per ton. The ore is crushed, and delivered by a belt-conveyor to the various mill-bin compartments. From the latter it passes by automatic feeders to the 12 five-stamp batteries of 850-lb. stamps. The pulp discharges from the batteries through 24 to 40-mesh screens upon amalgamating plates, there being two sections of plates below each battery. The mill crushes an average of 325 tons in 24 hours and uses 140 gal. water per minute. The supply of water being limited, the mill water is passed through launders to six settling tanks, holding 65,000 gal. water each; after being clarified the water is pumped back to the head of the mill for use again. In this way 70 per cent of the water is made available for duty again. The recovery of the gold by plate amalgamation appears to be so thorough as not to justify further treatment of the mill tailings.

The mill and all other machinery about the property are operated by electric power, the current being transmitted from the Missouri River Power Company's plant, 22 miles away. The Big Indian mill, as at present constructed, has been in operation a year and a half. Allen C. Mason, of Tacoma, is president of the company.

THE ZENITH FURNACE AT DULUTH.

By Dwight E. Woodbridge.

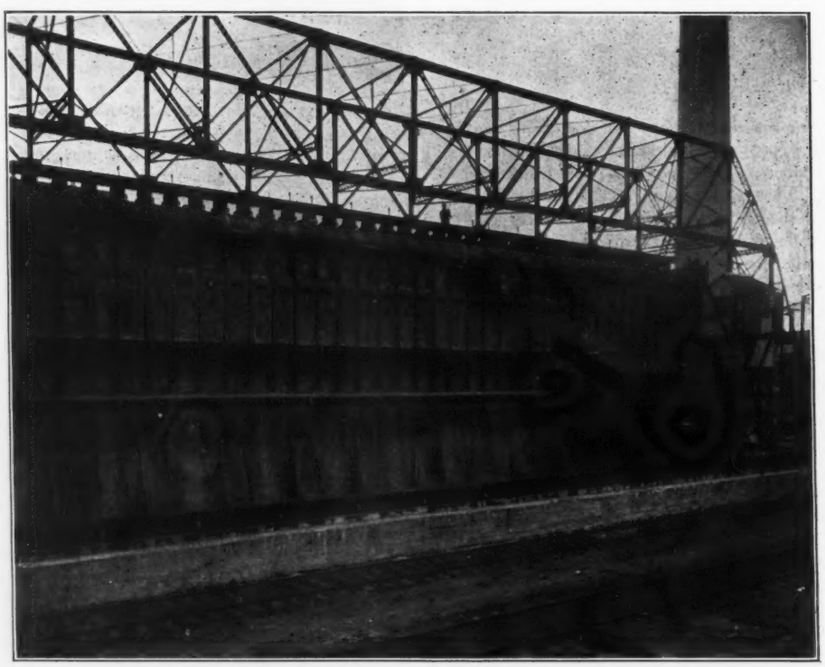
The first effort at iron making at the head of Lake Superior was at Duluth in 1871, when the firm of Schoenberger & Bryant put up a 30-ton charcoal blast furnace. There was no thought of ore in Minnesota in those days and the Marquette range was the sole source of supply. Ore was brought from Lake Erie at a cost that would be ruinous to-day, and a poor grade of charcoal was made from a mixture of hard and soft woods in the immediate vicinity of the furnace. The idea was to consume the product at home and for a while car works were operated. But it did not need the panic of 1873 to show the futility of the effort. Nothing more was done until 1892, when a 150-ton coke furnace was erected by a local company. This has been twice remodeled and enlarged, and at times made a good deal of money. A year ago it was bought by the Zenith Furnace Company, and was again enlarged, this time to 250-ton capacity. The furnace ran long enough to demonstrate its ability and was successful, but in the fall was closed down for a complete overhauling and the construction of a coking plant.

ZENITH FURNACE, DULUTH.

Contracts were made with the American Coke & Gas Construction Company, owner of the Otto-Hoffman patents, for the installation of a complete and modern plant of a capacity for about 350 tons of coke daily. The cities of Duluth and Superior closed agreements for all gas for municipal use and much of the tar by-product was placed with a company organized for the manufacture of tar paper; the rest will probably go to road-paving companies, for it has been found an ideal binder for macadam pavement for the cold region where the company is situated, and is already in considerable use. Work on the coking ovens began last fall and has been steadily pushed until now, when the plant is in successful operation. The furnace blew in August 10.

The fuel side begins with a coal dock covering 300 by 1,200 ft. and capable of storing more than 250,000 tons of coal and ore. Its seasonal capacity for shipment is very large, for it is fitted with perhaps the fastest receiving and discharging plant at the head of the lakes. This coal dock was built by the Barnett Record Company, well known contractors. The foundation for docks and the rest of the new work consisted of about 10,000 long piles, driven to refusal, and the entire plant was then filled with sand dredged from the company's channels in front. Sand was all placed back of heavy solid cribbing of western fir timber and the depth of the channels reaching the company's property is 21 ft., so that any ships sailing the lakes may easily land full cargoes there. On the inner face of this coal dock is a series of pockets, 40 ft. high, for handling coal for shipment, for the company expects to do a large forwarding business and is even now shipping about 70 cars of coal per day to the railroad trade. Around the entire periphery of the dock, and above these pockets, is a cable railway, handling cars that load, traverse the dock, and unload, all automatically. The handling of cargoes out of ships is by three of the well known Mead hoists, which probably come nearest to eliminating human labor of any dock rigs in use for coal, expense of installation considered. Traversing the width of the dock above the pockets is a steel bridge, movable along the entire length of the structure, and connected with the cable railway by adjustable switches. This bridge also carries a pickup for coal, for handling material out of the storage piles beneath. In the construction of this dock more than 4,000 ft. of western timber was used, together with an immense amount of piling and earth filling.

On the inner side of the dock, below the cableway, is a Williams crusher for crushing to size coal destined for coking. From this crusher all coal so treated is passed 80 ft. in a Link-Belt conveyor to the top of a 1,200-ton bunker over one end of the oven plant. Beneath this bunker, and traveling the length of the ovens on a steel bridge suspended from above and quite independent of the oven structure, is a charging larry for the ovens. This larry is fitted with automatic scales and carries a load of 8 tons of coal, the charge for each oven. The idea in having it hang from an overhead bridge rather than trundle its heavy weight over the masonry structure is that the life of the latter will be materially prolonged. Discharge from the larry is through six pipes into the top of the ovens and the coal is thus evenly distributed. There are 50 ovens in this battery, contained in a concrete and masonry structure 36 ft. wide, 200 ft. long and 40 ft. high. Beneath and around the ovens are their combustion chambers, their regenerative chambers, their gas and liquid mains. At one end above is the large bunker for coal and the steel bridge, 200 ft. long, on which hangs the larry, traverses the structure. By-products pass to a brick and steel gas house where they are cooled and separated. By a new screen device in the cooling chambers, tar is extracted before it reaches the usual tar extractors. The plant,



COKE OVENS AT ZENITH FURNACE, DULUTH.

installed by the American Coke & Gas Construction Company, is its latest and probably its best installation. Minor changes from previous practice have been made throughout the plant, but it is of the general United Otto design.

The Zenith Company is now turning gas into city mains at the rate of about 10,000,000 ft. per month. There are 50 ovens in the battery, each 17 in. wide, 33 ft. long and 7 ft. high, for coal.

Tar and ammonia pass off and are shipped away, but the former will soon be utilized at home. It is expected that domestic consumption of gas will materially increase in consequence of the prices made. Municipal rates for gas at Duluth are now from 75 to 90c. per thousand ft., and the company sells to the city at a rate slightly lower. A rate still less will be made for gas for heating purposes and the Zenith Company stands ready to install a removable burner in any steam or hot water boilers in order to warm buildings to, say, December 15, and from, perhaps, March 15, of each year. It is not believed that a rate can be made that will compete with coal for possibly 90 days of the year. The Company expects that it will sell nearly all its rich gas product. Its coke costs at the furnace will, in this way, be materially reduced, and possibly offset almost entirely.

All construction about the entire works is of excellent design and of the most thorough workmanship. For example: a wind pressure of 70 miles an hour is built for, with the usual factor of safety added. In the 35 years of record there was only a wind in excess of 64 miles and then only of 2 minutes' duration. At furnace, coke ovens and gas works all machinery is either in duplicate or three machines are installed for the work of each pair. A complete water-gas plant has been installed, for city use, should the coke gas be unavailable.

The furnace is a 76-ft. stack, 16.6-ft. bosh, with 250 tons daily capacity. There are three large vertical compound blowing engines, three large hot-blast stoves and a modern plant throughout, except for the charging ship loading device in the stockhouse. But plans are out and material has been ordered to modernize this. The furnace will be strictly up-to-date.

This plant is well situated on deep water in the upper harbor of Duluth. It has a dock frontage of 6,800 ft. that may be increased to 8,000 ft. by the addition of another slip; and any ship that can enter Lake Superior can reach the dock with ease. The company is excellently fortified by association, among its stockholders, with many independent lines of material, transportation and marketing. It is no secret that the company stands ready, when opportunity offers, to extend its product as far as probable profit may seem to invite, and it is in this, in fact, that its chief importance lies. Mr. A. B. Wolvin, of Duluth, a man with wide interests, is prime mover in the enterprise. Associated with him are capitalists of Duluth, Chicago and Cleveland, including Pickands, Brown & Company, members of the Marshall-Wells Hardware Company, and many others. Mr. George W. Foote, formerly with the Illinois Steel Company, is superintendent of the furnace division; Mr. C. W. Andrews, formerly president of the Hamilton-Otto Company, is manager of the coal, coke and gas departments. The company has a capital stock of $1,000,000 at present.

WATER IN THE WITWATERSRAND MINES.

By T. LANE CARTER.

The water problem in the mines of the Witwatersrand is comparatively simple. The total cost for handling water is lower than in many other great mining districts. On one or two mines the amount of water encountered per shaft per day is over 100,000 gal., but the average for the outcrop of the Central Rand is 50,000 gal. per shaft per day, while for the first row of deep levels the yield is about 45,000 gal. per shaft per day. In most cases the water is very acid. There are springs in many deep level mines, however, between 200 ft. and 300 ft. below the surface, which give water suitable for boilers, or domestic purposes. Between 35,000 and 40,000 gal. of fresh water per month is pumped from each shaft, with a spring near the surface. This pure water is pumped up separately from the acid mine water. A water service supplies the residences with this spring water. In many cases it is the drinking water of the mine.

Before running into the boilers the water from the spring is treated in a purifier. Where the springs do not supply sufficient water, the mines buy water, the rate in some cases being 36c. per 1,000 gal. When supplying boiler water to the railroad crossing their properties the companies charge 72c. per 1,000 gal. Some mines are able to sell water to their less fortunate neighbors at the rate of 36c. per 1,000 gal. The muddy mine water is pumped high enough to allow a natural fall to the reservoir, situated as a rule, below the cyanide works. The sediment settles, and the water is used in the mills. The alkalinity of the mill water neutralizes the acid mine water. No mine in this country can afford to run water to waste until all dams are filled.

There is considerable sediment in the water of most mines, which carries gold, varying from 5 dwt. to 15 dwt. per ton. On some mines small settling pits are dug near the shafts, by means of which much of the sediment is caught. These pits are cleaned up every now and then, the material being sent to the mill along with ore from the mine. To insure a more complete settlement, and help neutralize the material, lime is automatically fed into the settling pits. If this is done, the water runs away quite clear from the settling pits.

The amount of water handled is, of course, very much greater in the wet season than in the dry. On one mine of the Central Rand, which, besides its own water, handles the water from two outcrop companies, the amount of water pumped during the wettest month of this year was 15,126,000 gal., while in the driest month 6,330,000 gal. were pumped. At times the pumps were unable to cope with the inflow of water, so that bailing was resorted to for a few hours each day. Handling water by skips, when the plant is not designed for it, is more expensive and inconvenient than pumping.

At the mine referred to, with vertical shafts of 1,100 ft., the total cost (including maintenance, salaries, stores, depreciation, etc.) works out at 64c. to pump 1,000 gal. of water. When the deep level company takes the water from outcrop companies, either a fixed charge for pumping is made, or the deep level company charges $24 per 1,000 gal. per day per month for the first 51,000 gal. per day, a reduction of 15 per cent being made on the amount pumped over and above this figure.

The outcrop company has decidedly the best of the bargain. The deep-level people begin to doubt the wisdom of breaking through the boundary pillar, and contracting to take the water of the outcrop company. The mining regulations provide for a pillar on the boundary line, 60 ft. thick, 30 ft. being in one mine, and 30 ft. in the other. In order to get this ore out, mines draw up agreements, with the sanction of the inspector of mines, by which all of the ore is extracted, except 12 ft. by 12 ft. pillars left every 100 ft. along the boundary line. Considerable ore is thus won, but the serious drawback, from the view point of the deep level, is that all the water must be pumped by the deep level company when the outcrop mine is abandoned. Were the pillar of 60 ft. left standing, the water could fill up the abandoned mine without interfering with the deep level company. It seems better in the long run, therefore, to keep the 60-ft. pillar, only breaking through with a raise at one spot for ventilation. When the outcrop mine is worked out this opening could be easily closed and the water effectually held back.

The acidity of the water causes difficulty. Until lead-lined pipes were put in, a pump column in a deep-level shaft commenced to leak in a few months' time. At one deep-level mine, the water from the outcrop companies ran down the shaft from the second level to the sump at the fourth level. Spray from this stream of acid water played havoc with the pipes, rails and electric wires in the shaft. Then the water was run through old stopes to the sump at the fourth level. This greatly improved matters, but corrosion of the outside of the pump column was so great that something had to be done to stop it. I have seen bolts and flanges eaten away by the water in less than a year's time. The lead lining on the inside of the pipes was efficacious; all the damage was on the outside by the dripping water.

The first idea was to box in the column, but this proved expensive and impracticable. The scheme adopted for the protection of the pump column, which has proved most effective was as follows: Each 25 ft. length of column was coated a number of times with the best Stockholm tar. Then a covering of jute or sacking was wrapped around the column, so that the water would run down the covering and not attack the iron. After tying the covering down securely, a heavy coating of tar was put on, and left to dry for a few days. A fortnight was taken up in thus thoroughly tarring and drying this protective covering. Especial care was taken to place an extra heavy covering, in the form of a bonnet, over the flanges and to tie it down securely. When the tar was thoroughly dry, the covering was hard and impervious to water. The column of a Cornish pump, protected in this way, was placed in a shaft three and a half years ago, and it is still in a satisfactory condition. By this simple device much money has been saved, as the column would have been renewed twice in this time had not efforts been made to protect the pipes from acid water. Specially made brass plungers are used in the Cornish pumps; clack-valves specially designed for acid water, are in use at many mines.

The usual practice in the deep level mines is to continue the vertical part of the shaft 70 ft. from the point where the incline commences. Fig. 1 is a cross section near the bottom of a vertical shaft. Instead of stopping the vertical part of the shaft at *A*, it is sunk

to *B*. This space gives a large sump. At *C* is the barrel of the last pump. When repairs are necessary here, it is rather an unhandy place to get at. Mr. C. J. Price has improved matters by running a cross-cut *D C* from the incline shaft to the barrel of the Cornish pump. In this way, material is easily brought in and the men can work to better advantage; the cleaning up of the sump from accumulations of sludge is facilitated; the cross-cut *C D* gives more sump space, which is sometimes desirable.

In the past Cornish pumps have had almost a monopoly on the Rand. They do not hold

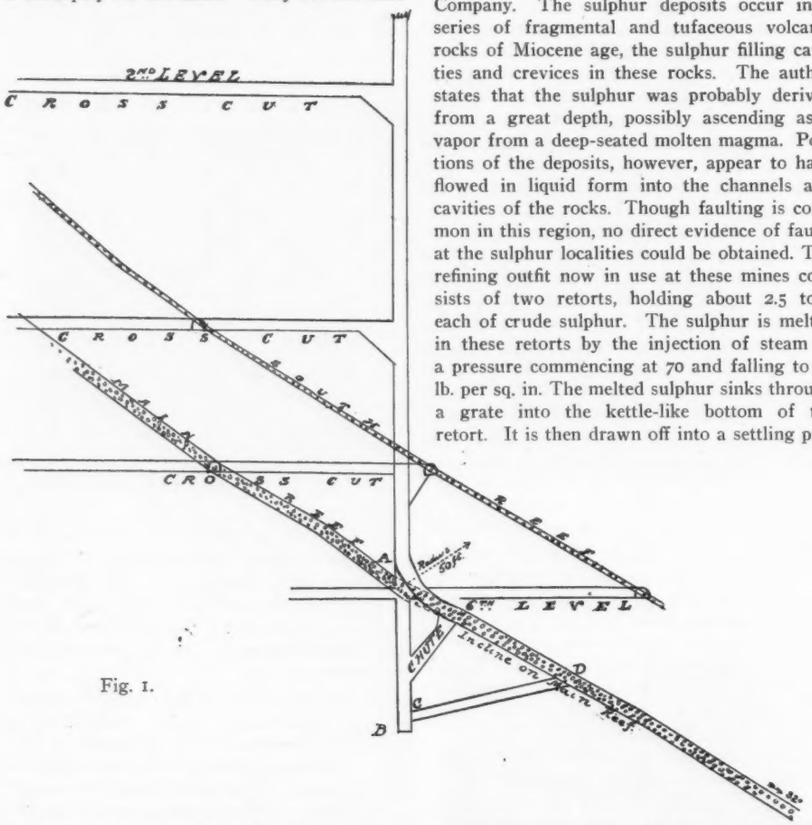


Fig. 1.

the field now; the signs of the times are that other pumping machinery will oust the Cornish pump from first place. One deep level mine, provided with Riedler differential air pumps with a lift of 1,200 ft., has proved the possibilities of this method of handling water. Electricity is coming into use for deep-level pumping, and in the future there will undoubtedly be more electric pumping plants than in the past.

There are two ways of handling the water on the incline shaft of a deep level mine; either a jack-head is put in and is attached to the pump column in the vertical shaft, or small air or electric pumps are used on the incline to throw the water up to the sump at the bottom of the vertical shaft. On a mine with two shafts intersecting the reefs at different depths, the water runs from the incline shaft of the shallower shaft to the sump at the bottom of the deeper shaft. This saves pumping water all the way up one of the inclines to the sump.

The output of petroleum in India increased from 19,000,000 gal. in 1897 to 56,607,000 gal. in 1902, nearly three times as much as in the earlier year. Most of this increase came from Burma, which produced 54,000,000 gal, in 1902.

RECENT LITERATURE ON ECONOMIC GEOLOGY.—XXV. ALUM AND SULPHUR.

By Edwin C. Eckel.

Adams, G. I. *The Rabbit Hole Sulphur Mines near Humboldt House, Nevada.* 'Bulletin 225,' United States Geological Survey, pp. 497-500.

The Rabbit Hole sulphur mines are located in northwestern Nevada, about 35 miles northwest of Humboldt House on the Southern Pacific. The deposits were first worked in 1874, and are now owned by the Nevada Sulphur Company. The sulphur deposits occur in a series of fragmental and tufaceous volcanic rocks of Miocene age, the sulphur filling cavities and crevices in these rocks. The author states that the sulphur was probably derived from a great depth, possibly ascending as a vapor from a deep-seated molten magma. Portions of the deposits, however, appear to have flowed in liquid form into the channels and cavities of the rocks. Though faulting is common in this region, no direct evidence of faults at the sulphur localities could be obtained. The refining outfit now in use at these mines consists of two retorts, holding about 2.5 tons each of crude sulphur. The sulphur is melted in these retorts by the injection of steam at a pressure commencing at 70 and falling to 50 lb. per sq. in. The melted sulphur sinks through a grate into the kettle-like bottom of the retort. It is then drawn off into a settling pan, being still kept liquid by heat. The sulphur is next run into molds carrying about 250 lb. each, allowed to cool and harden; broken and fed through a crusher, in which it is reduced to pea size. It is marketed either in this form in 100-lb. sacks, or as flour sulphur in 110-lb. sacks. No data in regard to production in Nevada are furnished.

Spurr, J. E. *Alum Deposit near Silver Peak, Esmeralda County, Nevada.* 'Bulletin 225,' United States Geological Survey, pp. 501-502.

A sulphur-alum deposit, as yet unworked, occurs about 10 miles north of Silver Peak, Nevada. The sulphur and alum occur as network of veinlets, and coating cracks and crevices in a dike of decomposed rhyolite which is intrusive in rocks of Tertiary age. The alum is a potash-alum (kalinite). Dr. Spurr considers that the sulphur has been formed directly by deposition from sulphurous volcanic gases, which immediately followed the intrusion of the rhyolite. The alum is thought to be of secondary origin, being due to a combination of the steam and sulphuric acid, emitted from these solfataras, with the potash and aluminum contained in the rhyolite. "This combination is rendered possible by a preliminary decomposition of the rhyolite by the escaping gases."

BOOKS REVIEWED.

The Michigan Engineer. 1904. Edited by F. Hodgman, Secretary. Climax, Mich.; published by the Michigan Engineering Society. Pages, 300; illustrated.

This volume contains the proceedings of the twenty-fifth annual convention of the Michigan Engineering Society, which was held at Lansing, Mich., in January, 1904. Besides the report of the proceedings there are a number of excellent papers mainly relating to municipal engineering, water supply and the construction of roads and bridges. The report shows the society to be in prosperous condition, and the numerous interesting papers prove the activity and loyalty of its members.

Geological Survey of Canada. Dictionary of Altitudes in the Dominion. Compiled by James White, Geographer to the Department of the Interior. Ottawa, Canada; Public Printer. Pages, 144; with maps.

This volume contains tables corrected up to the latest possible dates, giving the altitude of a large number of points in Canada. These altitudes are based on reports of the Geological Survey and of the Department of Public Works, upon railroad and canal surveys upon reports of boundary commissions and upon the reports of the Provincial Mining Bureau. The arrangement is alphabetical, by provinces and territories, the locality being given by counties in the case of the eastern provinces, and by latitudes and longitudes in the territories, and in those western provinces where the county system has not been adopted. The tables will be, of course, exceedingly useful in surveys of all kinds and in a great many cases to mining engineers.

Indiana. Department of Geology and Natural Resources. Twenty-Sixth Annual Report. 1901. Pages, 448; illustrated. . *Twenty-Seventh Annual Report.* 1902. Pages, 680; illustrated. W. S. Blatchley, State Geologist. Indianapolis; State Printer.

The two reports of the State Geologist of Indiana for 1901 and 1902 now appear bound in one volume. Each report includes a statement of the work and progress of the Survey for the period covered, with the reports of the State Inspector of Mines, which contain a great deal of information of the kind indicated by their titles. Besides these, there are the reports of the State Oil Inspector and of the Natural Gas Inspector for the two years. In addition there are several papers, two of them being on the Mineral Waters of Indiana, written respectively by W. S. Blatchley and Robert Hessler; one on 'Geologic and Topographic Section Across Southern Indiana,' by J. F. Newsom; 'The Geology of the Lower Carboniferous Area of Southern Indiana,' by George H. Ashley; and two reports, one on the Mollusca and one on the Orthoptera of the State, by W. S. Blatchley and L. E. Daniels. The volume contains many illustrations and a number of geological and topographical maps. It may be mentioned that the publication of the 1901 report was delayed by a difference of opinion as to the terms of the law providing for its publication.

In the list of papers given above we purposely omitted one of the most interesting and important papers. This in on 'Gold and Diamonds in Indiana,' and is written by Mr. W. S. Blatchley. The author says that "this paper has been prepared with a view to bring before the

public in an official manner what is known regarding the presence of these two valuable mineral products in the State. While both undoubtedly occur, the paper shows that they are not native, but are of glacial origin; that is, were brought in with sand, clays, gravel, boulders and other drift material from some point in British America. The gold is widely disseminated throughout the drift-covered area of the northern two-thirds of the State, but occurs in commercial quantity only in Brown, Johnson, Morgan and one or two other counties near the southern edge of the glacial boundary. Here the gravel deposits, forming the base of the lowlands along the streams, in places yield 25 to 40c. in gold per cubic yard. Under improved methods of hydraulic mining these gravel deposits would, in places, perhaps well repay the working. The present water supply is, however, too limited to carry on the work for more than three months in the year. A permanent supply of water can, however, be obtained within a distance of 20 miles. In some of the western States water is piped a much greater distance for working placer deposits less productive of gold.

"As to the diamonds, a few small ones have been found by the natives of the same counties while panning gold, but their discovery is only of scientific interest, as they are far distant from their original home. It is only by chance, at long intervals, that one is happened upon, and a search for one would be like seeking the proverbial needle in the haystack."

Ready Reference Tables. Volume I. Conversion Factors. By Carl Hering. New York: John Wiley & Sons. London; Chapman & Hall, Ltd. Pages, 216. Pricec, $2.50.

The present is the first of several volumes in preparation by the author, which are intended to contain collections of data conveniently arranged for ready reference. In this first volume, all the various measures used in practice, more especially by engineers and physicists, are given with their values in terms of as many of the others as they are likely to be converted into in practice; the reciprocals of these are also given, thus enabling every calculation involving the conversion of one measure into another to be reduced to a single, simple multiplication. Moreover, they are stated in such a form that errors due to dividing instead of multiplying are entirely avoided. It has been the intention to include every unit or measure used in practice, besides many that are now obsolete but are occasionally met with. The more usual foreign units or measures have also been added.

These conversion factors are not compiled, but have all been especially recalculated for this volume, under the direction of the author, from the exact legal values as far as such values existed, and from the very best, most standard, and most authoritative values obtainable, when no legal values existed. The greatest possible care was taken in selecting these fundamental values. They were obtained from the National Bureau of Standards, the Director of the Nautical Almanac, the International Geodetic Association, the United States Coast and Geodetic Survey, the United States Treasury Department, the adoptions and recommendations of international congresses and national societies, standard works of reference, and personal authorities, preference in the few cases of disagreement being generally given in the order named. The authority for each fundamental value is given. As all the conversion factors were calculated from the same set of fundamental values, they are all consistent with each other, forming a single, interconvertible, uniform system. It is believed that this is the first time such a complete set of conversion factors of all measures has been published, based on the accurate legal standard values. It is also believed to be the first complete collection of all the electric, magnetic, and photometric units, together with their interrelations, that has been published in convenient tabular form for ready reference.

BOOKS RECEIVED.

In sending books for notices will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of this JOURNAL.

United States Bureau of Education. Public, Society and School Libraries. Washington; Government Printing Office. Pages, 244.

Egyptianized Clay. By Edward G. Acheson. Niagara Falls, N. Y.; reprinted from *Transactions* of American Ceramic Society. Pages, 36.

Statistics of the State of Tasmania. 1902. Compiled in the Office of the Government Statistician. Hobart, Tasmania; Public Printer. Pages, 520.

Census of the State of San Luis Potosi. Compiled by Dr. Antonio Peñafiel. Mexico; published by the Ministry of Fomento. Pages, 324.

Mexican Republic, Territorial Divisions. The Central States. Prepared by Dr. Antonio Peñafiel. Mexico; published by the Ministry of Fomento. Pages, 356.

The Constitution of Portland Cement from a Physico-Chemical Standpoint. By Clifford Richardson. New York; published for the author. Pamphlet, 20 pages.

The Commercial Cotton Crops of 1902-1903. By James J. Watkins. Prepared for the Department of Agriculture. Washington; Government Printing Office. Pages, 80.

University of Illinois. Bulletin No. 20. The Coals of Illinois; Their Composition and Analysis. By S. W. Parr. Urban, Illinois; University Press. Pages, 40. Price, 25 cents.

Observations on the Geology and Geography of Western Mexico, Including an Account of the Cerro Mercado. By Oliver Cummings Farrington. Chicago; published by the Field Columbian Museum. Pages, 32; illustrated.

STEEL CHIMNEYS.—W. W. Christie, in the *Engineering News,* reports the following as among the high steel chimneys in the United States: Nichols Chemical Company, Brooklyn, N. Y., 310 ft. high, 35 ft. in diameter at base, 12 ft. at top. Pennsylvania Salt Company, Natrona, Pa., 225 ft. high, 10 ft. flue diameter. Maryland Steel Company, Sparrow's Point, Md., two chimneys, each 225 ft. high, and 13 ft. inside diameter. It is noteworthy that all these are at metallurgical plants. Also, the highest two brick chimneys are at metallurgical plants; the old Grant smelter at Denver, Colo., and the works of the Orford Copper Company at Constable Hook, New York harbor, each of these being about 350 ft. in height.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Anthracite Exhibit at St. Louis.

Sir: In the ENGINEERING AND MINING JOURNAL of July 7, on page 19, you give a description of the exhibits in the Mining Building made by Pennsylvania. In that description you make the following statement: "The larger part of this exhibit was prepared and presented by the anthracite companies jointly; the credit of inducing them to present this object lesson being due to Mr. Edward W. Parker."

In the first place Mr. Parker had nothing to do with inducing them to make this display. He had made an attempt to secure their coöperation, but, after thoroughly considering the matter, they refused to do anything. It was only after a long and serious effort on the part of representatives of the State commission that we succeeded in securing their assistance. The exhibit was made entirely by the State. The anthracite coal people, however, made a definite contribution in money and appointed an advisory committee to pass judgment upon the exhibits proposed for the anthracite coal part of the State display.

You will therefore appreciate that the exhibit, so far as its character and scheme is concerned, is a State exhibit—made possible only through the advice, coöperation, and large contribution of money on the part of the anthracite coal companies. For confirmation of this I would refer you to Mr. Parker himself, or to Mr. W. J. Richards, General Manager of the Reading Coal & Iron Company, Pottsville, Pa., who is chairman of the advisory committee of the anthracite coal companies.

I feel confident your idea of fairness will not permit you to leave this statement in your JOURNAL go without correction.

LOUIS E. REBER,
In charge of Mines and Metallurgy.

St. Louis, Aug. 3, 1904.

SIEMENS & HALSKE PROCESS OF COPPER EXTRACTION.

The Siemens & Halske process of copper extraction consists in leaching finely pulverized, roasted ore at 90° C. with ferric sulphate solution, containing free sulphuric acid. The ferric sulphate is reduced to ferrous, and copper is dissolved as sulphate. Electrolysis of the solution in a diaphragm cell gives copper at the cathode and oxidizes ferrous sulphate to ferric at the anode. This is an old process, having been described in British patents 14,033 of 1886, and 3,533 of 1889. M. DeK. Thompson, Jr., has recently studied the reactions (*Electrochemical Industry,* 1904, II, pp. 225-231). Raw copper pyrite is not appreciably attacked by ferric sulphate, but after roasting is readily soluble. Copper can be deposited from an acid solution of ferrous and copper sulphates until the concentration reaches a low value; that is, with a current density of 0.47 amperes per 100 sq. cm. until the concentration of copper in solution is 0.5 per cent, at which point spongy copper begins to form. Using carbon electrodes, the oxidation at the anode is at first very efficient, but as the concentration of ferrous sulphate decreases the process gradually falls off in efficiency.

ABSTRACTS OF OFFICIAL REPORTS.

Calumet & Hecla Mining Company.

This company owns and operates a property in the Lake Superior district, which is one of the great copper mines of the world.

Its report covers the year ending April 30, 1904. Unfortunately, this report gives no particulars of operation, so that it is impossible to obtain the cost of producing copper, or any other details. It does not state even the gross and net receipts of the year.

The output of the mine is reported only as follows; the tonnage of rock handled is not given. The figures are in short tons of 2,000 lb.:

	1903.	1904.	Changes
Mineral saved	42,216	41,612	D. 604
Refined copper made	38,316	38,310	D. 6
Per cent copper in mineral	90.8	92.1	I. 1.3

The only financial information given is the statement of assets at the close of the year, which is as follows:

Cash at mine office	$116,917
Cash at New York office	15,000
Cash at Boston office, loans, copper and mineral	5,939,001
Insurance fund, specially invested	757,691
Bills receivable, Boston and mine	451,521
Employees' Aid fund	6,208
Total assets	$7,286,338
Drafts in transit	$67,682
Bills and accounts payable	305,617
Mill extension and machinery contracts	330,000
Total liabilities	$703,299
Surplus, balance of assets	$6,583,039

In the inventory copper on hand is valued at 13c. and mineral at 5c. per lb. During the year four dividends were paid, of $10 each, or $40 per share in all; a total of $4,000,000 in amount.

The report of President Alexander Agassiz says: "The new openings of the past year on the conglomerate belt in the vicinity of the Red Jacket shaft have continued unsatisfactory. Rock mined in that district shows a decrease of about 15 per cent in copper from former years. The marked cutting out of the southern extension of our copper bearing ground has continued. We have abandoned all work of exploration in No. 12 Hecla shaft, (our most southerly opening), and are taking out the pillars of No. 11 Hecla shaft, no ground of any value having been developed by the deepest openings of that shaft. The slope intended to work the northern part of the mine (the 'five forties') has been started from the 57th level. It has been sunk a distance of about 150 ft.

"The underground electric pumps placed in No. 7 Hecla shaft have worked successfully since their installation and are now pumping from the 48th level. The Kimberly skips mentioned in the last report have been installed in two of the compartments of the Red Jacket shaft. The skips and the underground pockets needed for loading them have worked most successfully. Certain changes made at the Red Jacket shaft house render it possible to easily handle 2,000 tons of rock per day from two compartments.

"Last fall we started opening the Kearsage amygaloid. Three shafts have been located on the lode. In the most northerly shaft we have sunk on the vein and drifted a short distance. The quality of the rock encountered is fair.

"A large addition has been built to the Hecla blacksmith shop. It has enabled us to concentrate this part of the mine work in one shop. An addition is also building to the Hecla carpenter shop for the same purpose. A new and commodious armory has been built during the past year. It is now occupied by the local militia company. The building operations have been limited to the repair of a few houses for the officers and men.

"During the past year we have remodeled five of the heads of the Calumet mill. There are now 11 heads running, with new and economical milling and washing machinery. We have started the remodeling of the six remaining heads of the Calumet mill, and hope to have the whole Calumet mill of 11 heads running on the new system by May, 1905. With ordinary success the remodeling of the Hecla mill heads should be completed in the spring of 1907. An open tract has been graded south of our No. 1 coal dock and the dock frontage extended and equipped for the handling and storage of about 45,000 tons of coal. No changes of importance have been made either at the Lake Linden or the Buffalo smelting works.

"The expenditures for the Aid Fund during the fiscal year amounted to $52,469.39. The value of the Aid Fund is $112,498, at cost."

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc. preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Iron Ore.—I send you samples of an ore, and desire to get your opinion as to its uses and value. As shown by analysis it contains about 64 per cent iron oxide, 22 per cent silica and 8 per cent water.—J. A. H.

Answer.—The material is an impure limonite. It could hardly be used in the blast furnace, owing to its high content in silica and low tenor in iron. Such material is sometimes ground and sold as metallic paint or ocher, but we are of the opinion that the specimens you send do not show a sufficiently strong and bright color to be valuable for that purpose.

Magnesite.—We desire to get information regarding magnesite, which we understand is principally used in making bricks and carbonic acid. We wish particularly to know the quantity imported into the United States, the prices paid for the material, the specific purposes for which it is used, the form in which it is imported, the freight rates by steamer or sailing vessel, and the production and value of magnesite mined in the United States.—B. S. P.

Answer.—Magnesite is a compound of magnesium and carbonic acid, corresponding to the formula $Mg\ CO_3$. It resembles limestone in composition, and like the latter gives up or sets free carbonic oxide (CO_2) when exposed to a high temperature. The calcined magnesite (Mg O) is a valuable refractory material, and is used in the form of bricks or concrete as lining for open-hearth furnaces and converters in the steel industry, and as a non-conducting covering for boilers, steam-pipes, etc. A portion of the crude magnesite is also used for the production of carbonic oxide by treatment with sulphuric acid, epsom salt being recovered as a by-product. The chief sources of supply of magnesite are Austria, Greece and the United States. The production in this country, however, is small, amounting in 1902 to 3,466 short tons valued at $21,362. The deposits are situated in Tulare county, California. The imports of crude and calcined magnesite in 1902 were 49,786 tons, valued at $373,928. There were no exports. The material is imported mostly in bulk form. The freight charges are low, as it is shipped as ballast, the rates from the Mediterranean ports being about $1.50 per ton. You will find further details relating to the production, value, uses, etc., of magnesite in 'The Mineral Industry,' Vol. XI. An article covering the subject was published in the Engineering and Mining Journal, July 11, 1903.

Current quotations for magnesite, New York delivery, are: Greek, imported, crude, $5 to $5.50 per ton; calcined, $15 per ton. Magnesite bricks for furnace linings sell at $150 to $200 per thousand, according to size and shapes.

CEMENT RESOURCES OF VIRGINIA.

According to Mr. Charles Catlett, in 'Bulletin 225' of the United States Geological Survey, that section of Virginia which lies west of the Blue Ridge is bountifully supplied with materials suitable for use in the manufacture of portland cement. The argillaceous limestones of the Trenton formation, which furnish the well-known cement rock of the Lehigh district of Pennsylvania and New Jersey, are well developed throughout the Valley of Virginia. These limestones, with the overlying Hudson slates and shales, occur in a belt closely paralleling and in places touching the Valley Branch of the Baltimore & Ohio Railroad from the State line to Strasburg. From that point they lie close to the Southern Railway as far as Harrisonburg and again from Harrisonburg to a point some miles south of Staunton, Virginia, they are near the Baltimore & Ohio Railroad. The points that naturally seem most desirable as sites for cement plants are those which give ready access to the coal-fields, with favorable opportunities for the shipment of the finished product. Mr. Catlett discusses in detail the advantages and disadvantages of the various feasible sites for cement plants. He gives analyses of the limestones found at each point.

The only portland cement plant in the State is that of the Virginia Portland Cement Company, which is located at Craigsville. The conditions found there are typical of those existing at a number of places either on or near the Chesapeake & Ohio Railroad, both in Virginia and West Virginia. Wherever these same beds of limestone are found in a good state of development, an opportunity, more or less valuable—the value depending upon the local conditions—is presented for the manufacture of cement.

A NEW COAL FIELD IN AUSTRIA.—A recent issue of the *Oesterreichische Zeitschrift für Berg und Hüttenwesen* gives some particulars regarding a coal basin in western Galicia which has recently been opened. The coal field comprises an area of 20 sq. km. and lies between the towns of Dzieditz and Ostwiecim. The seams are large and favorably situated for working. The coal is of bituminous quality, and is said to be equal to the best Silesian coal for fuel purposes.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

LIABILITY OF CONSIGNEE FOR FREIGHT LIENS.—Where a consignee of carloads of coke was notified on their arrival that a charge for rental would be made if they were not unloaded within 48 hours, the railroad company was also entitled to a lien on the freight for such rental charges on failure to unload them within a reasonable time.—Schumacher v. Chicago & North Western Railway Company. (69 *Northwestern Reporter,* 825); Supreme Court of Illinois.

COMPENSATION PRO-RATED. WHEN OTHER CLAIMS ARE INCLUDED IN A SALE.—In an action for services rendered, where the owner of two mining claims agreed to pay another party for his services one-half of the proceeds of the sale of the two claims, but in the sale of these claims with other claims the interests were not separately valued, evidence is admissible to show that they were treated in such sale as being of equal value per acre, and that the price was based on the total acreage; and where it is impossible to determine what proportion should be credited to the claims out of which such party was to be paid, then he would be entitled to receive one-half of the entire proceeds of sale.—Huff v. Hardwick. (75 *Pacific Reporter,* 593); Court of Appeals of Colorado.

LEASE BECOMES VOID WHERE GAS IS NOT FOUND WITHIN TIME STATED.—Where an oil and gas lease provides that the lessees shall hold the premises one year, and so long thereafter as oil and gas shall be produced in paying quantities, the lease expires at the end of one year, unless gas has been found in paying quantities. Where such lease provided for the payment of $50 a month in advance, after a fixed term of 60 days, failure of the lessees to pay such rent during one month rendered the lease null and void under the provisions of the lease from the first day of the month in which such payment should have been made. An assignee of such lessees after the end of such first year cannot be held liable under the lease, as there was nothing to assign.—Chaney v. Ohio & Indiana Oil Company. (69 *Northwestern Reporter,* 477); Appellate Court of Indiana.

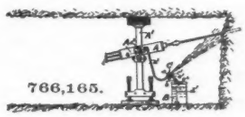
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending August 2, 1904.

766,165. APPARATUS FOR LAYING OR SETTLING THE DUST OR PULVERIZED ROCK CREATED IN BORING OR BLASTING HOLES IN MINING—Thomas J. Britten, Witwatersrand Gold Fields, Transvaal. In apparatus for use when blasting, bucket or water-holder, nozzle comprising air and water supply branches, means of fixing said nozzle at any desired angle or inclination, a water-supply pipe placing the water branch of the nozzle in communication with the bucket, and an air supply pipe placing the air branch of the nozzle in communication



with the air main, with means for regulating the supply of air and water, as may be required.

766,188. FUEL BLOCK OR BRIQUETTE.—George W. Hopp, Olympia, Wash. A fuel block consisting essentially of coal-dust or other comminuted combustible material, a binder of mineral oil or its residuum, a binder and coker of coal-tar, a hardening material of ferric sulphate, a combustible of rosin, and a smoke-neutralizer of calcium carbonate.

766,223. TELEPHONE SYSTEM.—William M. Davis, Chicago, Ill., assignor to Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. In a telephone system the combination with the primary and secondary windings of an induction-coil included only serially between the limbs of a telephonic circuit, of a battery and a transmitter included in said circuit, and a receiver included in a shunt-circuit about said secondary winding whereby to receive directly a portion of the current flowing in said circuit and to receive in addition the currents induced upon the secondary winding by the primary winding.

766,237. DIRECT-ACTING PUMP.—Hamlin F. Frisbie, Cincinnati, Ohio. In a direct acting pump, operated by a steam-engine, and where the plunger-rod of the pump and the piston-rod of the steam-engine are connected to each other, the combination of a fly-wheel, a crank-shaft upon which it is mounted, bearings in which this shaft is supported at right angles to the connecting-rod, a slide-rod supported so as to have a reciprocating motion parallel to and coextensive with the piston-rod of the steam-engine, means whereby the two are connected to each other so as to move as one, and connecting-rod between this slide-rod and the crank-shaft for operating this latter.

766,260. MACHINE FOR MAKING CEMENT OR CEMENTITIOUS PRODUCTS.—William E. Jaques, Grand Rapids, Mich. A machine comprising an interiorly-chambered case, a die having a flaring or inwardly-tapering mouth which is arranged in line and communicates with the chamber within the said case, and a suitably-operated screw arranged within and longitudinally of the said chamber and extending centrally through the mouth into the die beyond the inner end of the mouth.

766,288. ELECTRIC-WELDING CLAMPING DEVICE.—Adolph F. Rietzel, Lynn, Mass., assignor to Thomason Electric Welding Company, Lynn, Mass. The combination of a clamp-bearing jaw or slide and a clamp-jaw detachably secured thereto, of an adjusting screw for said slide and a fastening-rod for the jaw passing longitudinally through said screw.

766,289. PROCESS OF SEPARATION.—Alfred Schwarz, New York, N. Y., assignor to Charles N. Lindley, Individually and as Trustee, New York, N. Y. A process of separating different materials by the selective action of two liquids of different specific gravities, which consists in introducing the materials in a granular or pulverulent condition, quietly, without downward impetus, and without agitation, into a bath of oil floating upon water.

766,313. APPARATUS FOR FREEING OIL-WELLS FROM OLEAGINOUS OBSTRUCTIONS.—James Yoast, Lima, Ohio. In an oil-well heater the combination with an air-tight casing adapted to be introduced into an oil-well, of a centrally located metal supporting rod in said casing, an insulating-core surrounding said rod, a resistance material surrounding said core, and electrical connection to said resistance material to cause the heating of the same.

766,363. APPARATUS FOR WELDING RINGS.—George W. La Voo, Steubenville, Ohio, assignor of one-half to La Belle Iron Works, Steubenville, Ohio. In a rolling-mill, a mandrel a plurality of shaping-rolls arranged to form a pass between the mandrel and the shaping-rolls, and a guide movable back and forth across the space between two of the shaping-rolls.

766,400. PROCESS OF MANUFACTURING GAS AND COKE.—John C. H. Stut, Oakland, Cal. A process of manufacturing gas and coke, said process consisting in heating a body of coal to incandescence within a chamber by passing air simultaneously over said coal and through said coal from below, heating a body of coking-coal in a closed bottom contiguous chamber by heat passing through the walls from the first-named chamber whereby coal-gas is evolved from the coking coal, then cutting off the air from the first-named chamber and passing steam through the coal therein from below and transmitting the water-gas thus formed to mix with the gas arising from the coking-coal and afterward fixing and delivering the mixed gas.

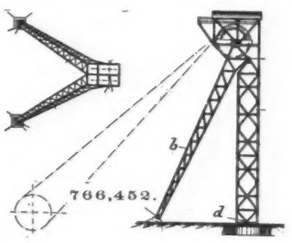
766,404. SAFETY APPLIANCE FOR ELEVATORS OR MINING CAGES.—Willard P. Ward, New York, N. Y. In an elevator, the combination with car, of a friction device, automatically operated by the car, when it travels at abnormal speed, to bear against the car and retard or check the movement thereof.

766,407. PULVERULENT-COAL-FEEDING APPARATUS.—Wiltsie F. Wolfe, New York, N. Y., assignor to Peter B. Bradley, Boston, Mass. In a pulverulent-fuel-feed device, the combination with suitable delivery means of a fuel-hopper there for provided with a reciprocatory foraminous bottom and loosening-spurs inclined in both directions of movement of said bottom.

766,417. AUTOMATIC CATCHER FOR TIN-PLATE MILLS.—Charles A. Bottorff, Chicago, Ill. The combination of a receiving-table, a carrier provided with a series of arms adapted to pass under a plate on said table, means for elevating said carrier, a second carrier having arms adapted to project under the plate on the arms of the first-named carrier, and means for elevating the arms of the second carrier to raise the plate from the arms of the first carrier.

766,434. ROLLING-MILL.—Victor E. Edwards, Worcester, Mass, assignor to Morgan Construction Company, Worcester, Mass. In a rolling-mill, the combination of a repeater having a portion of its side movable, and means for varying the angle which said movable portion makes with the plane of the repeater.

766.452. DERRICK FRAME FOR SHAFT-HOISTS.—August Klönne, Dortmund, Germany. A derrick-like structure for shaft-hoists, comprising a vertical pillar having a pivotal support at its lower end, and a



pair of inclined struts, the struts being pivotally connected to the upper end of the pillar, and the pivots at the lower ends of the pillar being located in the axial center of said pillar.

766,504. METHOD OF PRODUCING ELEMENTS FOR ELECTRIC CELLS.—Isidor Kitsee, Philadelphia, Pa. A method of producing economically elements for electrical cells which consists in first producing a series of supports for said elements, as one mechanical unit, in second, providing the surface of said electrodes electrically with a high oxide, in third, providing the space of said supports with electrically-charged high oxide, and in fourth, severing said supports into a series of separate electrodes and providing each of same with means to connect the same to a circuit-wire.

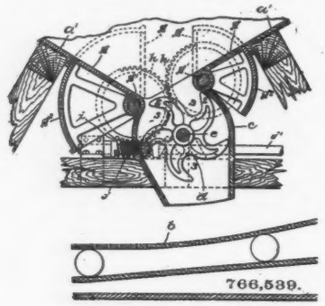
766,521. LOADING OR UNLOADING APPARATUS.—John Randall, Deadwood, S. D. In loading and unloading means, a removable car platform or deck having strips with hook ends on its under side, and appliances as binding-chains connected therewith for securing a load of brick thereon.

766,530. APPARATUS FOR GENERATION OF GAS.—Wilbur A. Salisbury, Winona, Minn., assignor of one-half to Charles O. Goss, Winona, Minn. A gas-generating apparatus, comprising a plurality of retorts each having an independent supply, a gas-mixing chamber having valved communication with each retort, and burners beneath the retorts and gas-mixing chamber having valved communication with said chamber and communication with the air.

766,531. TUBE-FORMING MACHINE.—Julius H. Schlafly, Canton, Ohio, assignor to The Berger Manufacturing Company, Canton, Ohio. In a tube-forming machine, a mandrel held in fixed position, a central, reciprocating, folding-head provided with a concaved face, means for imparting a reciprocating movement to said folding-head, lateral folding-heads provided with folding-plates, one of the folding-plates being capable of yielding movement, and means for imparting a reciprocating movement to the lateral folding-heads and their plates.

766,539. APPARATUS FOR FEEDING ORE, COAL, ETC.—William R. Smith, Buffalo, N. Y., assignor of one-half to Harrison D. Folinsbee, Buffalo, N. Y. An

apparatus comprising a hold or receptacle having an outlet chute, a belt conveyer arranged to receive mate-

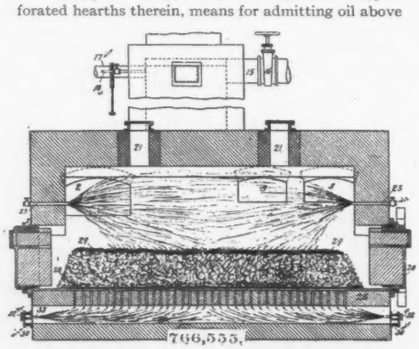


rial from said chute, and a rotary gate located in the chute and extending across the same, said gate having curved wings forming pockets which are arranged to deliver charges of material in close proximity to each other upon the conveyer, the edges of the wings being rigid to force their way through resisting material.

766,553. APPARATUS FOR THE MANUFACTURE OF GAS AND COKE.—John C. H. Stut, Oakland, Cal. A series of ovens with intervening diaphragms capable of transmitting heat from one oven to another, perforated hearths upon which fuel material is placed within the ovens, passages connecting said ovens above the normal fuel-line, valve-controlled passages through which air may be admitted over the ovens, and flues below the hearths and extending lengthwise of the ovens and forming other passages whereby air is admitted to either of the series from below whereby the heat developed in one of the ovens is transmitted to form coke in the other oven in conjunction with the heat which is applied from below.

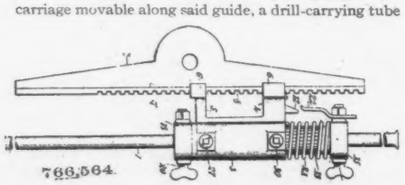
766,554. PROCESS OF MANUFACTURING GAS.—John C. H. Stut, Oakland, Cal. A process of manufacturing gas which consists in heating an oven having a laver of non-combustible porous material in the bottom, to incandescence, injecting oil into this oven to form an oil-gas and to deposit upon the non-combustible incandescent bottom an oil residue, allowing this residue to coke and then employing and consuming this coke in the manufacture of water-gas by admitting steam up through the said material and coke.

766,555 APPARATUS FOR MAKING GAS AND COKE.—John C. H. Stut, Oakland, Cal. In gas-making apparatus, a plurality of contiguous ovens, perforated hearths therein, means for admitting oil above



the hearths from opposite ends of the ovens, means for admitting air or steam or both from opposite ends of the ovens beneath the hearths, said ovens connected at one end above the hearths and having discharge-passages at the opposite ends, and means whereby the gases generated in one oven must traverse the space of the adjoining oven before being discharged.

766,564. ROCK-DRILL.—Frederick L. Whitehead, Butte, Montana. A rock-drill comprising a guide, a carriage movable along said guide, a drill-carrying tube



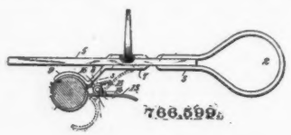
movable in the carriage, and means for imparting rotary motion to said tube while moving back and forth, the said rotary motion being at all times in the same direction, and the said means causing the degree of rotary motion to increase with the increasing length of drill-strokes.

766,579. METHOD OF SAMPLING COPPER.—Ralph Baggaley, Pittsburg, Pa. A method of sampling copper plates or slabs, which consists in casting, on the surface of such plate or slab, marks indicating the location of the sampling-holes, and obtaining samples from the various slabs at differently-located portions of the plate.

766,584. EXCAVATING-MACHINE.—Charles C. Battey, Springfield, Mass. In combination, a support, duplicated booms, extending outwardly at opposite sides of said support, one pair downwardly inclined and the other pair upwardly inclined, and having wheels at their extremities, a pair of centrally-located elevated wheels, a pair of flexible carriers running around the sets of wheels, means for imparting traveling movements to the flexible carriers, and shovel-buckets secured to the flexible carriers.

766,588. APPARATUS FOR RINSING THE CORES OF ROCK-DRILLING MACHINES.—Josef Brejcha, Strasburg-Neudorf, Germany. In a rock-drill, the combination with a tubular drill-stock, a casing carried by the drill-stock and bearing against the surface to be drilled and means interposed between said casings and the drill-frame for moving said casing forward, said means comprising a rearwardly-extending arm carried by the casing, a socket on the drill-frame for receiving said arm and means carried by said arm for moving the same forward.

766,599. DEVICE FOR HOLDING CANDLES.—Edgar W. Curtiss, Baker City, Ore., assignor of one-half to George Fronhofer, Baker City, Ore. A device for holding candles, comprising a spike having a handle, a bracket secured to the spike and having a projecting portion of curved contour, a socket-section



secured to said member and having a wing portion provided with projecting lugs spaced from the socket-section, a second socket-section adapted to coöperate with the first section provided with an integral wing and thumb-piece, and having projecting lugs spaced from the socket-section and in vertical alignment with said first-named lugs, a pin passing through registering holes in said lugs and carrying a coiled spring whose opposite ends engage the separate wings.

766,626. GOLD-SAVING APPARATUS.—Edward S. Kelley, St. Joseph, Mich., assignor of one-half to Willis W. Cooper, Kenosha, Wis.; Henry S. Cooper, executor of said Willis W. Cooper, deceased. In a gold-saving apparatus, in combination, a sluice-box; a bottom trough extending longitudinally thereof; amalgamated partitions in said trough; mechanism, a portion of which extends transversely of said sluice-box from side to side thereof and divides the sluice-box into a plurality of compartments; means for actuating said mechanism to positively move earth and water with comparative slowness through said sluice-box to prevent current in or agitation of the fluid mass; and a pocket having an inlet-opening in its upper side near the discharge from said sluice-box, into which inlet-opening gold particles may fall by gravitation.

766,654. METHOD OF RECOVERING VALUES FROM ORES BY DISSOLVING IN MOLTEN BATHS.—Ralph Baggaley, Pittsburg, Pa., and Charles M. Allen, Lolo, Mont.; said Allen assignor to said Baggaley. A method of producing matte or copper, which consists in forming a molten bath of matte, blowing air thereinto, adding ore relatively high in silica, fluxing thereby the iron of the bath, and replenishing the bath with material relatively low in silica and high in matte-making compounds.

766,655. METHOD OF SMELTING ORE AND CLEANING CONVERTER-SLAG.—Ralph Baggaley, Pittsburg, Pa., and Charles M. Allen, Lolo, Mont.; said Allen assignor to said Baggaley. A method which consists in contributing heat to the charge of a copper-ore-smelting furnace, and recovering values contained in the slag of a copper-converter by pouring molten converter-slag upon the charge in such furnace.

766,656. METHOD OF PRODUCING MATTE.—Ralph Baggaley, Pittsburg, Pa., and Charles M. Allen, Lolo, Mont.; said Allen assignor to said Baggaley. A method of producing matte or copper, which consists in forming a molten bath of matte, blowing air thereinto, adding from time to time relatively small quantities of metal-bearing ore high in silica, fluxing thereby the iron of the bath, replenishing the bath with material high in fuel values, and heating the additions of ore before they are delivered to the bath.

766,670. AUTOMATIC EXCAVATING-SHOVEL.—Thomas Cox, Portland, Ore. The combination with a suitable housing of a swinging shovel and means for moving said shovel in one direction outside the housing and in the other direction within the housing.

766,717. PROCESS OF DISTILLATION OF CRUDE OILS FROM PINE-WOOD.—John C. Mallonee, Charlotte, N. C., assignor of one-half to John Jefferson Mallonee, Crichton, Ala. The art of reducing pine wood and dividing its distillates into three fractions of graduated specific gravities which consists in filling the retort with wood and applying steam or water-vapor to the same at the same time applying heat; conducting the distillates into a receptacle where its specific gravity can be tested and continuing the process of distillation as long as the specific gravity of the distillate lies between the limits of 0.855 and 0.92; changing the discharge and catching means of the distillate and continuing the distillation until the outflowing oil or distillate lies between 0.92 and 0.96, the average being about 0.94; then again changing the means for catching and discharging the distillate and distilling the wood completely with an outflow or distillate of an average gravity of about 1.015.

766,718. ORE-CONCENTRATOR.—Howard E. Marsh, New York, N. Y., assignor, by mesne assignments, to Jarvis Simmons & Company, incorporated, New York, N. Y. The combination with a drum having a magnetic disk at one end thereof and feeding mechanism upon the drum; of a suction-fan at the opposite end of said drum, and a series of baffle-plates interposed between said disk and fan.

766,732. VALVE MECHANISM FOR BLOWING-ENGINES.—Edwin G. Rust, Pueblo, Colo. The combination in a compressor of a cylinder, a piston, a head for said cylinder including a structure provided with a plurality of cylindrical surfaces having ports in them, independent inlet and discharge valves coacting with said ports, and operating mechanism connected to the valves, there being also in the head a port or ports opening into the cylinder and placed to serve as the common means of communication between the ports of said surfaces and the cylinder.

766,781. COATING OR LINING MATERIAL FOR METAL OBJECTS.—Maximilian Toch, New York, N. Y. A protective compound containing cement to which has been added albumen and calcium oxide.

Reissue No. 12,254. ROASTING FURNACE.—Lewis T. Wright, Keswick, Cal. Original number 629,023, dated July 18, 1899; also reissue No. 11,932, dated September 17, 1901. In a roasting furnace the combination with a series of floors, of a central hollow shaft, hollow arms carried thereon over the respective floors, an open-bottomed pipe inserted in said shaft, an intermediate pipe in said shaft into which the first pipe discharges, open-ended pipes leading from the intermediate pipe into the hollow arms, and feed and exhaust pipes connected to the first pipe and hollow shaft.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week ending July 16, 1904.

13,454 of 1903. TREATING SULPHIDE ORES.—T. Huntington and F. Heberlein, London. Heating a charge of sulphides to make sulphate, then cooling and mixing with hot ore and fuel, in presence of current of air, thus removing the whole of the sulphur.

17,445 of 1903. IRON ORE BRIQUETTE.—T. Rouse and H. Cohn, London. Making briquettes of fine iron ores by mixing with dilute solution of silicate of soda and hardening by means of steam and hot air.

18,763 of 1903. PRODUCING CHLORIDES OF METALS.—Allgemeine Electro-metallurgische Gesellschaft, Elberfeld, Germany. Producing chlorides of metals, such as copper and nickel, from sulphides, by immersing the ground ore, or matte, in a solution of chloride of calcium together with ferric oxide and subsequently recovering the chlorine.

20,409 of 1903. TAILINGS ELEVATOR.—Adolf Bleichert & Company, Leipzig, Germany. A tailings elevator consisting of a bridge-like structure inclined at an angle of repose of the tailings and capable of extension as the tailings heap increases in size.

28,400 of 1903. ELECTROLYTIC PRODUCTION OF OXIDES.—F. F. Hunt, New York, U. S. A. Production electrolytically of oxides and hydroxides of metals by using anodes and cathodes of the metal in question, the electrolyte being a salt of an alkali or alkali earth metal whose radical is capable of forming a salt with the metal of the electrode.

6,209 of 1904. STAMP MILL.—R. Taylor, Subiaco, West Australia. Substitute for cams in stamp batteries, consisting of levers operated from a crank shaft.

SPECIAL CORRESPONDENCE.

San Francisco. Aug. 3.

(From Our Special Correspondent.)

The gold dredging men around Oroville not only have a prospective fight with the Anti-Debris Association, but also troubles closer at home. The citizens tried to incorporate the town so as to be able to stop the encroachment of dredges in the corporate limits, but an election last week went against incorporation, so the dredger men won on that proposition. Now comes the question of assessment of the land available for dredging. The Butte County Board of Equalization has just raised the valuation of 14 acres of land being dredged by J. H. Leggett from $2,800, the amount placed against the property on the assessment books, to $28,000. Strong objections were made against this raise in valuation but to no avail, and there is much friction between the dredge men and the Butte county assessors. Before dredging began the lands were assessed at an average value of $7.50 per acre; some as low as $2.50 and some as high as $40. When dredge mining began such ground was raised to $65 per acre, followed by another raise to $100. It is now proposed to double even this figure for the ordinary run of dredge ground with special rates for exceptional cases. The miners argue that where a large body of land has been bought for dredging some of which may be idle many years, the increased assessment should only be on that portion which is being worked, and that after it has been worked and is useless the rating should be materially reduced. These gold-bearing lands are held at from $250 to $1,000 per acre and in some cases as high as $3,000 is paid. The assessors take the position that the ground when mined becomes useless as a source of revenue and want to get all they can out of it while it is considered valuable. The Butte county people seem to be treating the dredge men about as some of the Shasta county people treated the Mountain Copper Co.

The dredger men are seeking elsewhere for available lands and buying them in Calaveras, Shasta, Trinity, Sacramento, El Dorado and Yuba counties. The men who are prospecting the Reid ranch near Redding, Shasta county, have recently secured possession of the Gibson ranch of 158 acres on Clear creek, in the same county. Last week 15 placer claims were recorded along the Yuba in Yuba county in the name of the Yuba Consolidated Gold Dredging & Exploration Co. These claims add considerable acreage to the present holdings of the Hammon Company along the Yuba river bottom land. Two dredges are in operation and more are to be built in this Yuba section. Gold dredging at Oroville last year showed a yield of over a million and a quarter dollars in gold, far surpassing any other industry in Butte county.

The oil fields of Kern county, now the most productive in the State, seem to be quite profitable, even though the prices of oil continue low. Nine companies pay regular monthly dividends amounting in the aggregate to $894,000 yearly, and the profit of the company which is controlled by the Santa Fe railroad makes this come up to about $1,000,000 yearly. The principal company, the Associated Oil Co., pays no dividends as the earnings are invested in improvements and developments. Should it decide to pay dividends another $1,000,000 would be added to profits. There are about 5,000 acres of proven territory in the Kern river field, to which the above refers, and about 1,000 producing wells. As each well is supposed to drain about an acre, it is seen that about one-fifth of the field is producing. The companies have not been getting over 20c. a barrel for oil during the past year.

The Coalinga, Fresno county, field produces the lightest and best oil in the State and considerable development is going on in that section, while several new discoveries have been made. The California Oil Fields, Ltd., is sending out from Section 27 about 100,000 bbl. a month, selling at a rate of about 60c. per bbl. Some 30 miles of pipe of the new pipe line are laid, ready to put in the ground and the contract for the first pumping station has been let. A deposit of asbestos is about to be opened in the Coalinga section and also several cinnabar prospects.

The Clio Mining Co., owning a mine near Jacksonville, Tuolumne county, has brought suit to prevent the sheriff from selling the property of the company to satisfy a judgment obtained by W. G. Nisbet. The case involves confusion of this company with another called the Clio Mining & Milling Co., incorporated in New Jersey, while the Clio Mining Co. was organized under the laws of Maine. The two companies are entirely distinct.

The demurrer of the defendants in the case of the California Mining Corporation against W. J. Hupp and others has been sustained by Judge Morrow, of the United States Circuit Court. The company bought a mine in Trinity county for $150,000 from the defendants, taking certain representations for granted and expecting to win great rewards. The company was represented by R. J. Anderson, who figured he would get some $266,844,800 out of the ground. The suit was to recover $41,786 alleged to have been lost, owing to misrepresentations of the defendants. The judge decided in favor of the defendants, however, and dismissed the case.

It is reported that the money for the purchase of the Mammoth copper property near Kennett, Shasta county, has been deposited in a San Francisco bank. The original owners are R. M. Saelzer, J. A. Kahny and A. Jaegel, of Redding. The plans of the purchasers include the construction of a 500-ton smelter.

Denver Aug. 6.

(From Our Special Correspondent.)

A telegram from Thermopolis, Wyo., states that J. J. Neville will be turned over to Sheriff Bell, of Cripple Creek. Neville, who was a saloonkeeper, is supposed to be implicated in the Independence outrage, driving the carriage in which the scoundrel who did the terrible deed escaped.

Attorneys Hawkins and Murphy, of the Western Federation of Miners, are getting up the necessary papers, to apply to the United States Court, for an injunction against the Mine Owners' Association and the Cripple Creek Citizens' Alliance, restraining them from any further deportations and from interfering with the return of deported miners, about 100 of whom are in Denver at present, and anxious to return. A committee of two of the Interstate Mercantile Commission, which was organized at Butte, Montana, for relieving the families of deported men in the Cripple Creek district, is expected here daily. On August 1 a picnic was held at Pinnacle Park, near Cripple Creek, for the benefit of the sufferers by the Independence explosion, and about $3,000 was cleared, making the total of the relief fund about $12,000. Business was almost entirely suspended throughout the district and many mines shut down. The railroad company operated hourly trains to the park and donated one-half of the proceeds of the day.

During the past few days, a number of the leasers on the Stratton's Independence property have begun work. Several hundred applications had been received, but it is stated that only about 25 have been granted. When the leasing plans are carried out, there will be a large output from the property.

The Colorado Fuel & Iron Co. has purchased over 10,000 acres of iron land in Laramie County, Wyo., for about $500,000, including the Sunrise iron mines, which had for several years been leased by the company. The company uses ore from mines at Orient, Colo., and Hanover, N. M. The Wyoming Railway & Iron Co., which consists of a number of Chicago men, and Charles Guernsey, of Wyoming, were the owners.

The Independent Smelting & Refining Co., which has purchased the Carpenter pyrite smelter in Golden, 15 miles west of Denver, will probably begin work about August 15. Thus far the pyrite smelters in Colorado have been hampered by want of capital, to purchase and keep on hand a supply of ores and by the lack of an independent refinery for their copper matte, which carries the gold and silver. The former, it is understood, will be provided and the company is trying to arrange to sell the matte to the best advantage. Mr. M. A. Bettman, from New York City, will be the general manager, and his assistant will be Robert S. Billings, who has had 20 years' experience in smelting. Considering the low freight tariff, established lately by the Colorado & Southern and the Colorado & Northwestern Railroad companies, on certain low-grade ores, from Boulder, Gilpin and Clear Creek counties, there should be a steady supply of ores for this smelter, which will start with a capacity of about 250 tons per day. Low-grade ores will be treated principally.

Mr. William Cox, general manager of the Camp Bird mines near Ouray, Colo., who has been seriously ill at St. Luke's Hospital, Denver, is reported out of danger and recovering.

Salt Lake City. Aug. 6.

(From Our Special Correspondent.)

The management of the Continental-Alta mine at Alta, announces that arrangements have been completed for rail communication. Negotiations have been pending for some time between the producers and the Rio Grande Western Railway Co., the latter owning a broad gauge line 8.5 miles long, between Sandy and and Wasatch and 7.75 miles of narrow gauge tramway between Wasatch and Alta. These lines have been out of commission for several years, but it is stated that they are to be repaired and operated as soon as possible. The road is to be narrow gauge all the way from Sandy to Alta. Mine owners are ready to guarantee from 300 to 500 tons of down freight daily.

The sale of the Salt Lake & Utah Valley railroad during the present week to J. G. Jacobs, manager of the Salt Lake & Mercur railroad, brings the announcement that this line will be extended 14 mines to Bingham, where it will compete with the Rio Grande Western for ore traffic to the valley smelters. The road is 7 miles long and electrically equipped.

The new 150-ton concentrating mill at Alta is under cover and the equipment is being installed. The plant will be ready not later than September 15.

The extension of the San Pedro, Los Angeles & Salt Lake railroad from Frisco to Newhouse will be completed the coming week, when material and equipment for the Newhouse 800-ton concentrating mill will begin to arrive.

Salt Lake representatives of the Central Coal & Coke Co., state that the monthly output of that corporation's Wyoming mines is between 40,000 and 50,000 tons.

The officers of the Lincoln mine are considering the matter of building a smelter. John T. Hodson, of Salt Lake, is manager. The property is in the Pearl mining district, Idaho.

Calumet. Aug. 6.

The present summer is marked by an activity in exploration in the Michigan copper country which is almost unprecedented. Probably only once in its history, 1899-1900, have the present conditions been equalled. As a result of that period of exploration activity, the copper country has to its credit to-day five fully developed and successful mines—the Mohawk and Centennial on the Kearsarge lode and the Baltic, Trimountain and Champion on the Baltic lode. One of these lodes—the Kearsarge—owes its discovery and profitable development to earlier exploration; but the Baltic lode legitimately owes its successful exploitation to the exploratory work which began in 1898 and continued until in 5 years an unbroken forest was changed into a busy mining camp, employing over 5,000 men and peopled with hundreds of permanent homes.

Therefore it is not strange that the copper country looks upon the present activity in exploration with much satisfaction. No new lodes are receiving serious consideration, unless the diamond drill probing which the Calumet & Hecla Mining Co. is giving to a conglomerate two miles west of the Calumet conglomerate, half way between the Calumet conglomerate and the shore of Lake Superior, be included. But the exploration on the extensions of the Kearsarge and the Baltic lodes, beyond their already proven zones, is of a character to give promise that the next five years will see progress equalling that of the last half decade. The

exploration of this year is attended with circumstances radically changed from those of four and five years ago, and is separated from that period by clearly marked boundaries. The pioneer work which resulted in the development of the Mohawk, Centennial, Baltic, Trimountain and Champion was carried forward under the impetus gathered from a 17c. copper market. The decline in copper did not cause any cessation in the development of the properties, as before the decline came they were so far established and their values were so well proven that no one, knowing the conditions, could question the profitableness of the mines at lower metal prices. The present period started when the price of the metal was probably somewhat below the normal, showing an assurance in the values of the lodes and in the future stability of the metal market and the demand for copper which is reassuring.

Toronto Aug. 4.

(From Our Special Correspondent.)

For some time the want of uniformity in classifying the pre-Cambrian formations has been a considerable source of confusion. In 1902 an International Committee on Geological Nomenclature was appointed, comprising representatives of the United States and Canadian geological surveys to secure uniformity in geological terminology, and the following year a sub-committee of that body was appointed. This committee, comprising Prof. Van Hise, Dr. C. K. Leith and Dr. A. C. Lance, representing the United States, and Dr. Bell, acting director of the Dominion Geological Survey, Dr. Frank D. Adams, professor in McGill University, and Mr. W. G. Miller, Ontario, provincial geologist, representing Canada, are now visiting typical localities in the United States and Ontario to agree on the nomenclature to be adopted. They were to begin their work at Ishpeming, Mich., yesterday, and after completing their investigations on the American side will visit the typical occurrences of Laurentian and Huronian rocks in Ontario.

The most serious mining accident that has hitherto taken place in New Ontario occurred on August 2, at the Shakespeare gold mine near Webbwood, resulting in the death of six men. The miners, descending a shaft 100 ft. deep by ladders, were overcome by fumes from a blast and fell off one by one, without even being able to warn those above them. The victims included N. Macmillan, mine manager, of Sault Ste. Marie, and Peter Reid, engineer, of Little Current. Manager Macmillan was formerly at the Mikado gold mine in the Lake of the Woods district and had had experience in South Africa. W. E. H. Carter, provincial inspector of mines, has gone to Webbwood to investigate the disaster.

Thomas J. Drummond, vice-president of the Lake Superior Corporation, is endeavoring to secure from the Ontario government an order for the rails for the extension of the Temiskaming & North Ontario Railway, from New Liskeard, northward. He stated that the works at Sault Ste. Marie are now ready to begin making rails. The quantity required will exceed 10,000 tons. The commission in charge of the railway work would make no definite promise, but said that when the question of the supply of rails came before it, a Canadian firm would certainly have favorable consideration.

The office of the *Canadian Mining Review* has been removed from Ottawa to Montreal. The paper has passed into the hands of the Review Publishing Co., in which the heirs of the late B. T. A. Bell hold a controlling interest.

The properties of the Cape Breton Coal, Iron & Railway Co. at Cochranes Lake, Cape Breton, have been bought by an English syndicate, headed by Messrs. Tayhew and Leech, that will begin development and construct a branch railway to tap the Sydney & Louisburg line and another branch to the shipping pier at Louisburg. Mr. Leech claims that the output of the coal mines when fully operated will be 2,000,000 tons annually. The syndicate anticipates being able to ship coal by the end of 1905. T. H. Lancaster has been appointed general manager, and George B. Jacques, chief engineer.

Victoria Aug. 2.

(From Our Special Correspondent.)

Yukon.—Rich new ground is reported discovered on Thistle creek, in the Stewart district; one claim is said to show pay gravel which has yielded as high as $2 to the pan.

Atlin.—At a public meeting recently in Atlin, the following resolutions were adopted: "That all hydraulic leases in the Atlin district, on which assessment work has not been done, should be cancelled forthwith." "That it is the opinion of this meeting that hydraulic leases on Volcanic creek should not be granted." The general opinion of miners in the district appears to be that leases adjacent to placer claims in actual operation should not be granted, as interfering with the prior rights of the individual miner. The North Columbia Hydraulic Co. has installed one of the largest plants in the district, is using two 7-in. nozzles, is about to begin at the lower end of the Deeks property. The company has doubled the capacity of the ditch, which now carries 2,500 in. of water.

Cariboo.—The Slough Creek Co.'s manager reports great improvement in draining gravel and decreasing pumping during the wettest season of the year, with splendid prospects in gold. He further states that the decrease of water in the tunnel when everything on the surface is flooded by the spring freshets proves that there is no connection between the channel and the surface water, that the clay carries all the surface water, and continued pumping will drain and dry the channel gravels. He says the showing of gold is, under the unfavorable conditions for saving, exceptionally rich, and when it is possible to drift in the main channel the mine will prove one of the best placer mines ever worked on the continent. It may take some little time to drain the workings completely. The recent decrease is, however, noteworthy, and, if it continues at the same rate, the mine will soon be in a workable condition.

Similkameen.—From a run of 24 hours last week at the Nickel Plate mill, at Hedley, gold was recovered worth $10,000.

Lardeau.—The Great Western mine has shipped 26,000 oz. of gold and silver bullion to the Trail works. There are private reports that the new combination mill is not working satisfactorily, failing to save an unduly large percentage of the silver in the ore. Development operations are steadily prosecuted at the Triune mine, and men are clearing a right-of-way for the aerial tramway to be shortly installed. Shipments are maintained at the rate of a ton a day of high grade ore. It is announced that work will be resumed at the Silver Belt group on Brown's creek. Shipments have begun on the Black Prince group on Gainer creek, 30 tons of rich ore being shipped last week to Trail. It is expected that production will be steadily maintained.

Slocan.—In the Slocan City division negotiations for the purchase of the Black Prince & Slocan Prince claims by the Pioneer Mining Co. are being concluded, and work on these properties will begin shortly with a force of 40 miners. The returns from a recent mill run on Chapleau ore gave values of $20.50 to the ton saved on the plates. The mine, including a 10-stamp mill and aerial tramway, is being acquired by a syndicate that has acquired an option.

Nelson.—A promising discovery of galena is reported made near Crawford Bay, and the claims are showing up well. The returns from the Ymir mine for July place the value of the output at $16,000, the working expenses being the same. The manager reports that the outlook is improving and that the 660-ft. level is looking well.

Boundary District.—A number of properties have been bonded on working terms, including the Silver King and Silver Cloud in Skylark camp and 11 claims round by the Boundary Creek Mining & Milling Co., near Greenwood. All six furnaces at the Granby smelter are in operation and a long run is anticipated.

London. July 27.

(From Our Special Correspondent.)

There seems to be some hope that the Tasmania Copper Co. will be able to yield some returns to its unfortunate shareholders after all, for the recently acquired property in South Australia is turning out fairly well. The company was originally formed in 1897, to acquire copper mines at Rosebery, Tasmania, but the ore opened up badly and became a refractory zinc proposition, utterly unamenable to any known process. In 1902 a copper prospect at Blinman, South Australia, was obtained for the trifling sum of £850. This prospect has been developed energetically, and a sufficient supply of ore has been exposed to warrant the erection of a smelting furnace capable of dealing with 100 tons a day. The mine is not turning out to be a bonanza, for many parts of it are disappointing, but there seems, on the whole, to be some profitable ore there. In addition to the supply from the mine, a good deal of custom ore can be obtained in the district from properties that have no smelting facilities. There are many natural difficulties to be contended with at this mine, such as scarcity of water supply, cost of transport, etc., but these are gradually being overcome. On the amount of money actually spent on the mine a respectable profit ought to be eventually made, but unfortunately the company is heavily overburdened with the capital expended on the purchase and exploitation of the Rosebery property, so that the profits will be correspondingly dwarfed.

The report of Camp Bird, Ltd., for the year ended April 30 has just been published. During the year 500 dividends, absorbing £164,000, have been paid, and £116,118 is carried forward. On April 30 there were 230,000 tons of ore ready for treatment, either broken in the stopes, or blocked out. No details of the contents of these reserves are given, but there is Mr. Hammond's estimate that the total net profit will be $4,700,000. As he says that the existence of some of the ground included in the reserves is not absolutely proved, the above estimate can only be taken as a general one, or as an individual opinion. During the year under review the 60-stamp mill treated 73,718 tons of ore, wet, yielding gold, silver, lead and copper valued at $1,922,000, and the expense during the same period amounted to $674,000. In considering the value of the shares as an investment, or speculation, it has to be remembered that a large sum has still to be paid to Mr. Walsh out of profits. The mining market estimates the value of the £1 shares at about 27s., so that the market capitalization of the company is about £1,500,000, the nominal capital being £1,100,000. Thus the market capitalization amounts to about double the future profits estimated by Mr. Hammond, after allowing for the payments still to be made to Mr. Walsh, so that the confidence in the persistence of the lodes is pretty strong. During the last 18 months the underwriters, who floated the company here, have disposed of the greater part of their shares. The shareholders' list is now a very bulky one, and the average holdings are in lots of anything from 50 to 500 shares. In fact, the proprietorship is so split up among holders who have bought their shares on the market that nobody has the control of the property.

Monterey. Aug. 3.

(From Our Special Correspondent.)

It is believed that the project of a new smelter in Monterey for the Norias de Bajan Mining Co. has been abandoned. This company, after the expiration of its contract in February last, for the selling of its ores to Smelter No. 3 (the Monterey plant of the American Smelting & Refining Co.) was not able to get what it thought a fair treatment charge for a new contract. It obtained a concession for the building of a smelter, but not being able to raise over $700,000 Mexican, which was not sufficient, the plan was temporarily abandoned, though not given up. As the directors had been working on it for some time, they had ceased to pay dividends from the earnings since the previous December, and ceased shipping ore at the expiration of the

contract with the smelter last February, though mining continued. There are now some 5,000 tons of ore, valued at $200,000 Mexican, at the railroad station, ready for shipment. At the annual meeting of the company, July 31, an option was given to Mr. Edward Doerr to take or sell this ore for five years at a figure averaging about $3.50 Mexican per ton better than prices that could be obtained from the smelter, and the expectation is that the matter will be settled this month between Mr. Doerr and the new board of directors, of which Mr. Luis Guimbarda is president and Mr. Francisco Madero is vice-president. The properties of this company were examined and reported upon early this spring by W. B. Potter, of St. Louis, Mo. Mr. O. H. Harker, for a number of years in charge of the Guggenheim Exploration Co., here in Mexico, is manager of the property, which is located at Bajan, Coahuila.

Last week 200 Japanese arrived at Las Esperanzas, Coahuila, under contract to work three years in the coal mines of the Mexican Coal & Coke Co. This is the second shipment of Japanese laborers by this company, and they have been found much more reliable than the Mexican, who, with his national and religious holidays, and often a day or two a week for getting drunk, is a very uncertain quantity. This company, under the management of Edwin Ludlow, has been working only about 4½ years, but has built up a town of about 10,000 inhabitants, and is making a production of 2,000 tons of coal and 200 tons of coke, which runs about 15 per cent ash and high in fixed carbon, per day. Its railroad from Barroteran to Las Esperanzas is being pushed on to its newly acquired fields at Muzquiz, about 30 miles from Barroteran. Besides the Mexican Coal & Coke Co., the other important coal producers in the State of Coahuila are the Coahuila Coke Co., at Hondo, about 16 miles, and Mesquite, half a mile, from the Sabinas station of the Mexican International railroad, whose annual production will amount to 250,000 tons of coal and 25,000 tons of coke; the Fuente Coal Co., at Fuente, on the Mexican International, with an annual production of 160,000 tons of coal, and the Monterey Iron and Steel Co., with a production of 150,000 tons of coal a year from its mines at Felipe.

Another and stronger movement appears to be on foot for a smelter in Oaxaca. This latest is headed, and the concession obtained, by T. J. Ryder, formerly with the Mexican Metallurgical Co., at San Luis Potosi, later with Guggenheim Sons, at Aguascalientes smelter, but at present manager of the Waters, Pierce Oil Co. (The Standard Oil Co.), in Mexico. Associated with Mr. Ryder are C. A. Hamilton, J. C. Catlin, and M. J. Cartan, of New York, and Max Friend, of London. It is understood that five-year contracts have already been obtained from some of the mines, favorable railroad rates have been secured, and that of the $300,000 gold capital (one-half for construction and one-half for a working basis) $200,000 has been subscribed, and the remaining $100,000 is being raised in Denver by W. J. Cartan, the owner of the Escuadra mine in Oaxaca.

Sydney. July 12.

(*From Our Special Correspondent.*)

Queensland.—The gold yield during the half year amounted to 310,201 oz. fine, a decrease of 10,299 oz. from the output for the same period in 1903. The Charters Towers field contributed 189,000 oz., valued at £513,000 and paid dividends of £205,000. The returns from the Gympie field indicate a considerable falling off, while no new developments of importance have been reported for some time. The Mount Morgan Co. for the year ended June, heated 237,461 tons ore, and 37,794 tons tailings, for 109,902 oz., fine. This indicates an all-around decline of over 8s., 6d. a ton from the previous year. The mine manager reports that development work in progress with the aid of the diamond drill, has proved the existence of some 1,045,000 tons of ore of an approximate average assay of 8 dwt. gold and 3½ per cent copper, with other extensive bodies ranging from 2½ dwt. gold and 3 per cent copper to 1½ dwt. gold and 2½ per cent copper. To deal with this copper-gold ore on a scale consistent with its magnitude, a separate plant will be required, and the directors suggest that funds be raised by debentures.

No difficulty has so far been experienced in recovering the copper by precipitation. Interest in the rush at Dee, Mount Morgan, has been increased by the discovery of a nugget weighing 171 oz.

New South Wales.—The gold yield for the half year amounted to 141,682 oz. fine, an increase of 37,764 oz. fine, on the output for the same period in 1903. Copious rains have fallen. The last clean-up of the New Hillgrove Proprietary gave a return of 1,288 oz. from 190 tons of ore. In the Baker's creek mine a rich shoot of stone has been struck at the lowest (No. 15) level.

Victoria.—The record of the Bendigo field for the half year is highly satisfactory. During this period 120,029 oz. of gold were won and dividends paid to value of £186,198. The line of active operations extends for ten miles, and payable results are being obtained at depths ranging from 500 to 2,815 ft. The most noteworthy results were obtained from the South New Moon. During the half year ended May 13, 199 loads were crushed for 13,606 oz. The total cost of winning and milling this quantity, was 15s. 9d. per load; this covered all development work, including the cost of sinking the main shaft 105 ft. down to 1,355 ft. The returns from the Ballarat field show that operations have not been as successful as in the first half of last year.

The value of the silver and silver-lead ore exported from New South Wales during the half year amounted to £948,249. There has been a steady rise in Barrier (Broken Hill) shares, and it is surprising to find scrip at a higher level than when lead was 10s. above its present value. This buoyancy is due to optimistic statements made by the general manager of the Broken Hill Proprietary mine respecting the future of the Barrier mines as zinc producers. The Chief Inspector of Mines has recently examined all the workings, and reports that the stopes along the line of lode never looked better. The North Broken Hill mine has restarted after several years' idleness, and it is anticipated that the mill will soon be running up to its full capacity of 2,000 tons of ore per week.

Coal.—The coal exported from New South Wales during the half year amounted to 1,562,168 tons valued at £690,236, a decrease of 299,497 tons on the same period in 1903. Prominent among the decreases are shipments to the United States and the Philippines. A contract has just been entered into here for the delivery in Chile of 20,000 tons of best coal at 6s. per ton f. o. b. Newcastle. As the miners get 3s. 10d. per ton for hewing, there is but 2s. 2d. per ton to cover all charges and expenses from the face to the ship, a figure which appears to leave no possible margin for profit. The mines at Gippsland (Vic.), are making little headway, despite the subsidy by the government in the way of reduced freight on the railways.

Copper.—The value of the copper exported from New South Wales during the half year is given as £243,392. The returns from the Chillagoe Mines (Q.) for the month of June show that 86 tons of copper and 30,200 oz. of silver were produced. The Mount Lyell Co. (T.) for the period May 26 to June 22, produced 603 tons blister copper, estimated to contain 595 tons copper, 59,166 oz. silver and 1,671 oz. gold. At the Wallaws Mines (S. A.) development work is being pushed ahead and a number of improvements and additions are being made to the plant.

Tin.—Encouraging reports are to hand respecting the find of tin at Port Darwin. It is stated that the deposits are extensive and that much ground yet remains to be exploited. Since January 70 tons of ore valued at £84 per ton have been shipped from the field. At the Smith's creek mine, North Queensland, boring has located a lode at a depth of 170 ft., 4½ ft. wide, assaying from 1 to 10½ per cent tin. The Briseis Mines, Ltd., (T.), in its recently issued report for the first quarter of the year, states that the yield for this period was 108 tons of black tin valued at £7,530. The value of the tin exported from New South Wales during the half year was £156,895. In the New England district (N. S. W.) the dredges have proved the ground to be payable, but much difficulty is experienced owing to the plants not being sufficiently powerful to handle the heavy granite boulders.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. C. L. Dignowity is visiting Yellowstone Park.

Mr. Percy L. Fearn was recently in Salt Lake City.

Mr. M. L. McDonald has returned to Butte from New York.

Mr. Alfred James has returned to London from South Africa.

Mr. George W. Lloyd is in the Thunder Mountain district, Idaho.

Mr. J. W. Flynn, of Parral, Mexico, is in this country on business.

Mr. John Leggett Pultz, has opened offices at 71 Broadway, New York.

Mr. Arthur L. Pearse is examining mines in the Quartzville district, Oregon.

Mr. Edwin E. Chase, of Denver, is in New Mexico on professional business.

Mr. Frank Klepetko has returned to New York from Houghton, Michigan.

Mr. Richard A. Parker is examining mining property in Guanacevi, Durango, Mexico.

Mr. Robert Gilman Brown recently returned to San Francisco from a trip to Honduras.

Mr. George A. Schroter will inspect copper deposits in Russia for American capitalists.

Mr. Geo. C. Munson has returned to Denver from a professional trip to lower California.

Mr. A. J. Houle has resigned as superintendent of the Ferris-Haggarty mines in Wyoming.

Mr. S. H. Pearce is inspecting the principal mining camps in the West. He will also visit Mexico.

Mr. S. S. Arentz is making an examination of Utah mining camps with Salt Lake as his headquarters.

Mr. George R. Mickle, lecturer on mining at the Ontario School of Practical Science, is in Europe.

Mr. Simon Guggenheim is inspecting various interests of the American Smelting & Refining Co., in Colorado.

Mr. Samuel Calvin, professor of mineralogy in the Iowa State university, is in British Columbia.

Mr. J. R. B. Tregloan has been appointed engineer for the Shenandoah Mining Co., near Plymouth, California.

Mr. Louis A. Wright has returned to San Antonio, Texas, after an absence in Mexico on professional business.

Mr. F. L. Hollman, president of the British Columbia Copper Co., Ltd., will visit New York and Washington.

Mr. Charles S. Onderdonk of the Onderdonk Engineering Co. of Denver, has returned to Denver from the East.

Mr. Charles T. Arkins left Denver, Colo., for Kalgoorlie, West Australia, to assume charge of milling operations.

Mr. A. F. Rising, recently at Madoc, Ont., is now with the San Carlos Copper Co., at Linares, Nuevo Leon, Mexico.

Mr. C. W. Whitley, manager of the Salt Lake plants of the American Smelting & Refining Co., visited Denver on August 6.

Mr. Charles E. Howlett, of New York, has been appointed manager of the American Steel Castings Works, at Chester, Pa.

Mr. Duncan McVichie, manager of the Bingham Consolidated properties in Utah, has returned to Salt Lake from Mexico.

Mr. Benedict Crowell, of Crowell & Peck, mining engineers, of Cleveland, Ohio, is examining mining properties in Alaska.

Mr. Silas Hitchcock, of the M. A. Hanna Coal Co., has been elected president of the Cuyahoga Coal Co., of Cleveland, Ohio.

Mr. J. Morton Fitzgerald has resigned as secretary of the Empire Steel & Iron Co. and is now associated with B. Nicoll & Co. of New York.

Mr. Vincent F. Shallcross, general manager of the Australian Gold Recovery Co., is in New York on his way from Western Australia to London.

Dr. Theodore Lewald of Berlin, the commissioner general of Germany at the St. Louis Exposition, is visiting mines in Colorado and Montana.

Mr O. H. Schultz has been appointed auditor of the Alabama Consolidated Coal & Iron Co. of Birmingham, Ala., to succeed Mr. G. M. Bowers, who has resigned.

Mr. D. H. Lentz has resigned as general superintendent of the plants of the American McKenna Co., at Joliet, Ill., and will retire from active business.

Mr. George Langford has been appointed general superintendent of the plants of the American McKenna Co., at Joliet, Ill., to succeed Mr. D. H. Lentz.

Mr. R. B. Lamb, recently with the North American Copper Co., at Encampment, Wyo., has gone to Australia, his present address being Sydney, New South Wales.

Mr. H. D. Milton has resigned as president of the Colorado & Northwestern railroad, and will devote his time to the development of mining interests at Jamestown, Colorado.

Mr. Robert C. Kirk, who is developing the Santa Rosa mines in western Durango, Mex., is at present reporting on the properties of a New York company near Canatlan, Durango.

Mr. H. W. Taylor, of the firm of N. & G. Taylor Co., of Philadelphia, manufacturer of tin plates, sailed from New York August 9 on the *Kaiser Wilhelm II.* for an extended trip abroad.

Mr. S. F. Emmons, of the United States Geological Survey, has been in Leadville, Colo., checking up his work preparatory to issuing his final report on the geology of the Leadville district.

Mr. Julius I. Wile, for many years connected with Fraser & Chalmers, in Chicago and London, has left their employ to enter upon the manufacture of gas producers at Rochester, New York.

Mr. Sidney B. Tyler, superintendent of the San Lucas mine in Durango, Mexico, has been in Denver to receive treatment for a serious injury to one of his eyes. The oculists hope to save his sight.

Mr. H. N. Galer, former assistant general manager of the Granby Consolidated Mining & Smelting Co., has been elected vice-president and general manager of the International Coal & Coke Co., at Coleman, Alberta, Canada.

OBITUARY.

John H. Zeller, president of the Zeller-McClelland Coal Mining Co., died at Brazil, Ind., July 30.

A. L. Maxwell, president of the East Tennessee Iron & Coal Co., of Knoxville, Tenn., died July 26 at the age of 80 years.

Edward Van Buren Hoes died at Asbury Park, N. J., August 4, aged 55 years. He was a promoter of mining enterprises in Mexico, and was one of a Philadelphia syndicate which is now developing gold and silver mines in New Mexico.

SOCIETIES AND TECNICAL SCHOOLS.

Mexican Geological Society.—This society held its first regular monthly meeting on June 1. The evening was devoted to the formation of the society, along the lines already mentioned in the JOURNAL. The sessions are held in the rooms of the National Geological Institute, 5a del Ciprés, No. 2728, Mexico City, on the first of each month.

The society started with 108 charter members, including many of the prominent Mexican geologists and scientists in allied branches, and several foreigners.

At the second meeting, on the first of July, the following papers were presented:

'Reseña del Desarrollo de la Geologia en Mexico,' by Sir José G. Aguilera; 'Las Barrancas de las Minas de Tatatitia,' by Sr. E. Ordoñez; 'La Faunà Pliocénica de Tuxtepec, Oaxaca,' by Sr. E. Böse; 'Criaderos Cupro-Argentíferos en Talalpa, Jalisco,' by Sr. A. Villafaña.

At the third meeting on the first of August, the second part of Sr. Aguilera's paper on 'Reseñ del Desarrollo de la Geologia en Mexico' was presented, and in addition the last two articles from the first meeting were read, they having been unavoidably omitted at the second meeting.

TRADE CATALOGUES.

'Why Use a Circuit Breaker?' is the suggestive title of the catalogue issued by the Cutter Co., of Philadelphia, Pa., manufacturers of the I-T-E circuit breaker. Its arguments are well prepared and convincing.

The Bristol Co., of Waterbury, Conn., has sent out a revised edition of its No. 13 recording pressure gauge catalogue. It is illustrated and contains price lists of the products of the company.

A tasteful little book, special price list No. 62 B, is issued by the Jeffrey Manufacturing Co., of Columbus, O. It contains descriptions and illustrations of the Jeffrey water elevators made by this company.

The Knowles Steam Works, of New York, is distributing Bulletin K 73, which describes its recently designed "express" pump. This pump is of the reciprocating type, and is directly connected to an electric motor without gears or belts.

A catalogue of high-grade crucible steels has been prepared by the Westmoreland Steel Co., of Pittsburg, Pa. It is an exceptionally well prepared little book, and contains much valuable information concerning the company's products.

We have received a special bulletin of the Capetown International Industrial Exposition to be opened in November and continued for three months. It contains descriptions of the proposed Exposition, with a bird's-eye view of the Exposition buildings.

The St. Louis Expanded Fireproofing Co., of St. Louis, Mo., has prepared and issued a small book, which illustrates the actual structures of the steel-concrete construction in which the corrugated bars made by the company have been employed. There are many illustrations, and the book as a whole is exceptionally well prepared.

'Compressed Air Haulage' is the title of an 80-page catalogue issued by the H. K. Porter Co., of Pittsburg, Pa., builders of light steam and compressed air locomotives. A history of the development of these locomotives is included with illustrations and descriptions of some of the most notable which the company has produced.

The Harmon S. Palmer Hollow Concrete Building Block Co., of Washington, D. C., has issued some very attractive literature describing its product. Among this is a handsome album containing pictures made from the original photographs of buildings constructed from the concrete building blocks. The company also issues a catalogue and a book of testimonials.

The Wellman-Seaver-Morgan Co., of Cleveland, O., manufacturers of safety hooks for hoisting cages in mines, describe their products in a little book just issued. The same company has issued a circular descriptive of the Cockerill gas engine. It contains a list of the companies in whose works these engines have been installed.

INDUSTRIAL.

The South Columbus Mining Co., at Alta, Utah, has placed an order for Ingersoll drills with the Utah Mining Machinery & Supply Co., of Salt Lake.

The Pennsylvania Steel Co. has begun the erection of an electrical ore concentrating plant at North Lebanon, Pa. It will cost about $300,000, and will have a daily capacity of 600 tons of iron.

The Allis-Chalmers Co., through its Salt Lake representative, has closed a contract with the Newhouse Mines & Smelters Corporation for three Gates crushers, for use at the Cactus mine in Beaver county, Utah.

The United States Steel Corporation has bought the wire plant of the Trenton Iron Co., at Trenton, N. J. The price paid for the property is not given. It will be paid for with United States Steel second mortgage 5 per cent bonds.

Contracts are to be awarded by the New Castle Portland Cement Co., of New Castle, Pa., for engines and other machinery for its new plant in that place. The Buffalo, Rochester & Pittsburg railroad is building a siding from its main tracks to the works.

The Ocala Foundry & Machine Works, of Ocala, Fla., has purchased a site upon which it will build a new plant with five times the present capacity. The company will then be prepared to manufacture phosphate mining and saw mill machinery in addition to general foundry and machine work.

A concession has been granted by the State Government of Chihuahua, Mex., to Maximo Krakauer, vice-president of the Mineral railroad, for an aerial tramway to connect the road at Santa Eulalia station with the principal mines in that section. The concession is for a line of 4,000 m. long and 4,000 more if necessary.

The Canadian Westinghouse Co., Ltd., Hamilton, Ont., has closed a contract with the Shawinigan Water & Power Co., Shawinigan Falls, P. Q., for a 6,600-kw. two-phase, 2,200 volt, 3,600 alterations, 180 revolutions per min., rotating field alternator, for direct connection with water wheel. Two 2,200-kw. oil insulated water cooled transformers, 2,200 volt primary, 50,000 volt secondary, are included.

The Utah Mining Machinery & Supply Co., of Salt Lake, has received an order for 36,000 lb. of steel for 60 Callow settling tanks which are to be installed in the plants of the Montana Ore Purchasing Co., at Butte. The equipment includes a surface condenser, air receiver, piping and specials to make up a pumping plant under this system. The capacity will be three million gallons of water per day.

The Chester Steel Castings Co., of Philadelphia, announces that the recent fire at its plant was small and in no way curtailed the output, being confined to one furnace and the building immediately over it. The company sustained the loss of but one furnace for a time, no damage being done to power and equipment, and two days after the fire the plant was in full operation and ready to handle all orders.

The plant of the Buffalo & Susquehanna Iron Co., at Buffalo, it is expected, will be finished early this month. Ceremonies appropriate for the occasion will be observed when the operation of the plant is begun. The ship canal to connect the plant with Lake Erie, and which is about 1 mile long, 200 feet wide and 23 feet deep, cannot be entirely completed before next spring. The ore bin located between the canal and the furnaces—800 feet long and 250 feet wide, with solid concrete bed—is finished and ready for use.

The working model concentrating plant built by the Allis-Chalmers Co., which forms one of the most interesting features of the State of Utah exhibit in the Mines and Metallurgy Building, is to be presented to the Utah School of Mines after the close of the Exposition. The company has added an interesting feature to its large exhibit in the Mines and Metallurgy Building in a display of the various sizes of its crusher shafts. These shafts vary in size from 17 ft. in length and seven tons in weight to baby ones of only a few thousand pounds.

The Cyanide Plant Supply Co. has removed from 56 New Broad st. to Broad Street Place, London.

The New River Coal & Coke Co., New River, W. Va., recently incorporated with $100,000 capital, will develop 50,000 acres of coal land in Scott, Anderson, and Campbell counties.

The Sprague Electric Co. has been awarded a contract for 20 small electric traveling cranes to be used in connection with the molding machines at the new plant of the International Steam Pump Co., at Harrison, N. J.

The Otis Elevator Co. has received a contract for 20 elevators for the plant of the International Steam Pump Co., at Harrison, N. J., 10 of which will be employed in the machine shop and two in the foundries.

The National Electric Co., successor to the Christensen Engineering Co., Milwaukee, manufacturers of Christensen air brakes and electrical machinery, has completed extensions to its foundries. They are equipped with every facility for rapid and economical output.

The S. H. Supply Co., of Denver, Colo., made a shipment of four 350-h.p. Babcock-Wilcox boilers to Ashland, Ky., within the past six months. This company has made shipments to West Ossipee, N. H.; Whitehall, N. Y.; Bristol, Tenn.; Marion, Ky., and Dislodge, Mo. The facilities for business have been increased by enlarging the warerooms.

At a recent meeting of the board of directors of the Bullock Electric Manufacturing Co., held on July 30, Mr. W. H. Whiteside, general manager of sales of the Allis-Chalmers Co., was appointed general manager of sales of the Bullock Electric Manufacturing Co., and will have entire charge of the sales department of both the Allis-Chalmers and Bullock organizations.

The Wisconsin & Michigan railroad will soon put on additional service from mines to its ferry docks at Pestigo, Wis. It is constructing tracks into the Aragon and other mines of the United States Steel Corporation and other properties at Norway and vicinity, and will soon have its main line so far completed that it can build into Chapin, Pewabic and other large mines of Iron Mountain.

The Power Mining Machinery Co., of New York, has taken upward of a million dollars' worth of orders for Loomis-Pettibone gas apparatus and Crossley gas engines during the one year that it has existed, as successor to the Holthoff Mining Co., of Milwaukee. These orders have been placed with the most representative and conservative companies in this country, Mexico, Canada, and New Zealand.

The Chicago, Burlington & Quincy railroad has recently purchased a No. 8 and No. 5 Austin gyratory crusher, elevators, screens, engines and boilers for 2,000-yd. ballast plant to be installed at Old Monroe, Missouri. Tupper Brothers, of Canton, N. Y., have installed an Austin gyratory crushing plant for producing rock for concrete and macadam purposes.

The Wellman-Seaver-Morgan Co., of Cleveland, O., has closed a contract with the Leiter Coal Co. for the construction and erection of a second hoisting plant at their mines at Ziegler, Ill. This plant will consist of a steel head-frame, equipped with double cylinder hoisting engine and all the necessary guides, counterweights, etc. This is the second contract which this company has taken for the Leiter Coal Co., the first consisting of a very complete hoisting and coal handling plant, which is now in successful operation.

The Risdon Iron & Locomotive Works, of San Francisco, Cal., gives notice that it has instituted—in the Circuit Court of the United States, for the northern district of California, an equity suit against the Western Engineering & Construction Co., and the Central Gold Dredging Co., for infringing certain patented gold dredging machinery, owned and controlled by the Risdon Iron & Locomotive Works. The patent claimed to have been infringed is what is commonly known as the Postlethwaite rotary separator gold dredge, the machine in general use on the Feather river and on property adjacent to Oroville, Cal. The suit will be watched with great interest by those interested in this class of gold mining.

GENERAL MINING NEWS.

ALABAMA.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

There is much development being prosecuted in the western part of this county; the Pratt Coal Co., the Sayre Coal & Mining Co., the Little Warrior Coal Co. and other companies are all working non-union labor. The development in this section has been more extensive than in any other part of Alabama.

WALKER COUNTY.

(From Our Special Correspondent.)

E. D. Stone, mining expert of the Southern Railway, has been in this county for some time investigating the coal lands belonging to the system, 72,000 acres in all, but a little scattered. There is no intimation that the Southern will go into the coal mining business.

Empire Coal & Coke Co.—This company's lands, valued at more than $300,000, have been purchased by Frank Nelson, Jr., Leo K. Steiner and others, who formed the Empire Purchasing Co. recently. The properties will be enlarged and operated.

ARIZONA.

COCHISE COUNTY.

Chiricahua Development Co.—This company has a hoisting works and pumping plant in operation at its mine at Paradise. A 1,000 ft-shaft is to be put down.

COCONINO COUNTY.

Brannen and Staley Claims.—These claims owned by D. J. Brannen and W. N. Staley in the White Mesa mining district, have been bonded to Eugene T. Merritt of Duluth, Minn. The reported price is $25,000.

LINCOLN COUNTY.

Douglas Smelter.—All ore mined at Bisbee is now being shipped to this smelter, as the Bisbee smelter is closed down.

MARICOPA COUNTY.

Red Rover Mining Co.—This company has taken over the Red Rover mine, 50 miles northeast of Phoenix. The property is well developed, and a large quantity of ore is blocked out.

MOHAVE COUNTY.

C. O. D.—A large quantity of ore is being shipped from this mine at Kingman.

Swiss-American Mining Co.—At this company's property at Kingman a new hoist has been installed. The shafts on the Ben Doran and Uncle Sam will be sunk to considerable depth.

Cedar and San Francisco.—The mills at these mines in the Cedar district are running on good ore.

Mocking Bird.—At this mine at Kingman a shaft is being sunk through the old works. The mine at one time produced much rich silver ore.

PIMA COUNTY.

Twin Buttes.—At this mine at Tucson a vein of water has been struck which it is thought will be sufficient to supply all the needs of the mine.

CALIFORNIA.

AMADOR COUNTY.

Wildman Mining Co.—At this property, Sutter Creek, John Ross, Jr., superintendent, timbers are being put in the Mahoney shaft and the Lincoln is being unwatered. The indebtedness will shortly be paid off.

Butte Basin.—At this mine at Butte City, gravel of good grade has been struck and an increased force of men will be put on.

Climax.—This mine is now running its 2-stamp mill on good ore.

Freemont Consolidated Mining Co.—Twenty of the 60 stamps of this mine at Drytown are dropping. Manager Arthur Goodall is working the mine on the "open shop" basis and the force is being increased. The strike of the union miners is still on.

Burlington.—At this mine, owned by Lutellus Smith, a hoist is being put in. The shaft is expected to tap one of the ledges at a depth of 600 ft.

CALAVERAS COUNTY.

Mountain King Mining Co.—This company at Murphy, Eugene Deleray, superintendent, is running its mill on good ore.

Hercules-Horseshoe.—At this mine near Murphy a new mill is being erected.

Sheep Ranch.—This mine at Sheep ranch is running night and day on good ore.

Reed Gravel.—A good body of gravel is now being put through the mill of this mine at Central Hill.

Prince.—This mine at Altaville is to be reopened by Chas. H. Bean, of Los Angeles, and J. F. Hamby, who have it under bond.

Hamby.—This quartz mine near Mokelumne Hill is under bond to Jos. King, of that place. A 20-stamp mill has been ordered, and grading for the foundation has been begun.

EL DORADO COUNTY.

Rescue Mining Co.—Arrangements have been perfected to put machinery on this mine at Rescue. R. M. Crackles has been elected president and Dr. A. P. Mariotte, of Oakland, secretary.

Sugar Pine.—W. J. Berry, Theo. Rupley and Bruce Graham have applied to the California Debris Commission to work this mine near Pino Grande by the hydraulic process.

MARIPOSA COUNTY.

Merced Mining Co.—The properties of this company at Coulterville are being inspected by Cleveland, Ohio, men and the company's mill is making tests. The Malvina and Mary Harrison mines are to be pumped out at once and the Potosi is to be thoroughly prospected. S. P. Mahan, of Cleveland, is manager of the work.

Princeton.—Since fire destroyed the hoisting buildings, etc. of this mine at Mount Bullion, owned by the Mariposa Commercial & Mining Co., repairs have been made. Excavations are being made for an iron building, and the machinery is being overhauled.

Champion.—This mine has resumed work and some rich ore has been uncovered.

Virginia.—At this mine, Daniel O'Toole owner and manager, 10 stamps are dropping on good ore.

MONO COUNTY.

Masonic District.—Logan, Parker & Simmons have begun work on their property in this district. Work is also being done on the Myrtle and Julia claim and on the Hermine. A proposition has been made to the mine owners by a San Francisco man to build a 5-stamp custom mill if they will guarantee a thousand tons of ore to be ready for it this fall.

NEVADA COUNTY.

Union Consolidated Mining Co.—This company, which is working the Union mine on Banner mountain, has cleaned out the drain tunnel and machinery is to be put in. N. J. Weber has been elected president; S. L. Leiter, secretary, and Geo. A. Nihell, superintendent.

Meister Group.—This group of claims near Washington has been bonded by Fritz Meister to Wm. Ochs for a Utah company. The Waldeck, Cañon Creek and Columbia claims are included. When the claims are fully opened it is the intention to put up a 60-stamp mill.

Gold Blossom.—In this mine at Grass valley, Richard Jeffrey, owner, a rich strike has been made in the lower tunnel.

Champion Mining Co.—This company at Nevada City, which has been running only 40 of its 70 stamps for some time, will soon set the other 30 at work, as ore of good quality has been accumulating.

Austin and Wedge.—These two claims at Willow valley have been bonded to N. P. Brown and Frank White and work upon them will shortly be begun.

North Star Mining Co.—This company at Grass Valley, A. D. Foote, superintendent, which has just paid a 25c. dividend, produced $365,000 in the last six months at an operating cost of $142,000, and an operating profit of $163,000, from which may be deducted $53,000 expended in general development of the North Star, including the Central shaft. This leaves a net surplus of $110,000 over costs of general operation and development. The new mill is nearly ready to run.

PLACER COUNTY.

Rising Sun.—At this mine near Colfax fire destroyed the hoisting works, 20-stamp mill, offices, etc. The mine has been in litigation some time and has been idle.

PLUMAS COUNTY.

Pat Mallory.—Very rich quartz has recently been found in the 100 ft. tunnel of this mine. A new 4-stamp mill is being put up. W. W. Sweet and E. H. House are in charge.

SAN BERNARDINO COUNTY.

Newberry Mountain.—Many prospectors have gone into the mountains in this region hunting for placers. Gold dust is plentiful in spots, but water is very scarce and the gold bearing area limited in extent.

Early Bros.—This mine near Shasta is being worked under bond by N. Eaton and B. Blair, who are also working an ocher mine in the old town of Shasta.

Redding Gold and Copper Co.—This company, owning some land along Clear creek, west of Redding, is to build a 2-mile flume to divert the water away from the creek to the point where it is to establish a power plant. The bed of the creek will then be worked for gold.

SISKIYOU COUNTY.

Phillips.—At this mine near Hawkinsville, recently purchased by Geo. V. Gray, a contract has been let for 195 ft. of tunnel on the vein.

Minetta B. and Williams Point.—These claims at Happy Camp are working night and day under supervision of T. J. Nolton and M. L. Gordon.

Pacific States Mining Co.—This company near Nolton, Mr. J. W. Martin, superintendent, will finish its flume, which is to convey water to the new diggings, this month. Water is taken out of Fort Gough creek.

Blue Ledge.—At this copper mine at Elliott creek, 15 miles from Nolton, work will be started under the superintendence of C. D. Gettis, of Colorado.

TRINITY COUNTY.

Mine Valuations.—The assessed valuation of the mines of Trinity county has been fixed at $510,206. Mining and irrigating ditches, which aggregate 636 miles, are assessed at $134,725.

Three Peaks.—The Great Western Mining Co., of Redding, has taken a 90-day bond on this mine from W. R. Conant and J. B. Cook.

TUOLUMNE COUNTY.

Longfellow Mining Co.—This company at Big Oak Flat, Fred Partington, superintendent, has bought the machinery, buildings, etc., of the Alameda mine and will remove them.

Horseshoe Bend.—Operations have been resumed at this mine, the damages by the late fire having been repaired.

Don Pedro.—The steam hoisting plant will shortly be at work and operations on a large scale be inaugurated.

Badger.—This mine, under bond to Jerome Cañon Mining Co., of Arizona, is being unwatered preliminary to development work.

Nellie.—This mine has been bonded by the San Francisco Street and Construction Co.

COLORADO.

BOULDER COUNTY.

Sugar Loaf.—The shaft at this mine at Wallstreet is being retimbered. A new hoist and boiler are to be installed.

Crown Lode.—At the mine, Wall street, the shaft is being connected with the tunnel which is in the hill about 200 ft.

CHAFFEE COUNTY.

Monarch District.—The output of ore from this district is about 1,000 tons monthly, most of it treated at the Salida smelter, but a considerable quantity goes to Cañon City and Pueblo.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Ore Shipments.—The shipments of smelting and crude ores, tailings and concentrates from the Black Hawk depot to the Denver smelters and outside points of treatment for July were 210 cars, or 4,200 tons—a falling off from June due to the holidays. Six cars of smelting ores were shipped from the Rollinsville depot to the Denver smelters, making a total of 4,350 tons shipped during the past month.

Newfoundland Gold & Silver Mining Co.—This company has incorporated with a capital of $300,000. N. E. Sherwood, G. W. Mabee and E. A. Knapp are the incorporators. It has taken the Newfoundland property on Gunnell hill and will sink the shaft and carry on extensive operations. George W. Mabee, Sr., of Central City, will be manager.

Colorado Tellurium Gold Mining Co.—This company has filed a certificate of paid up stock showing its capital stock to be $250,000. The property is in Gregory district of this county and also in Boulder county.

Roderick Dhu Gold Mines Co.—This company shipped during July 215 cords or about 1,830 tons of milling ores, averaging 2½ oz. gold to the cord, by amalgamation, and 7 cars of tailings which sold for as high as $22 to the ton. Top buildings will be erected and heavy hoisting plant of machinery will be installed in Roderick Dhu No. 485 shaft. This shaft is down 400 ft. and is to be sunk 200 ft. deeper and the entire group of mines will be operated through it. J. C. Fleschhutz, Central City, is manager.

Mutual Benefit Gold Mining Co.—Colorado and New York men are arranging to resume work on this group on North Clear creek and will also start work again on their Pleasant View property on Gunnell hill, where they expect to sink a new shaft, install new machinery and erect suitable top buildings. Dr. A. T. Free, of New York City, is manager.

Homestake.—Local parties have taken a lease and bond on this property in the Russell district and are preparing for active operations. The shaft is down over 100 ft. and it is owned by E. W. Williams, of Denver.

Pewabic Consolidated Gold Mines Co.—Eastern and California men are interested in a consolidation of the Pewabic and Federal groups of mines in Russell district. The mines are to be developed and operated under the management of John C. Fleschhutz, of Central City. The Federal shaft will be deepened and considerable drifting done. The Pewabic group has been practically idle for a number of years on account of water troubles, but has one of the best records in the county as a producer.

Gregory and Bobtail Mining Co.—This company will operate the Gregory, Bobtail, Fisk, Cook and other consolidated properties, situated at Black Hawk. The capital stock is $400,000.

GILPIN COUNTY.

Robert Emmet.—This mine in Perigo is being reopened and drifting has begun on the 104 ft. level.

Mountain Lion.—A tunnel has been driven 200 ft. into the vein at this mine on Elk Creek.

Smuggler.—A vein 3.5 ft. in width is reported in the breast of the tunnel at this mine in Moon gulch.

HINSDALE COUNTY.

Hanna.—A large body of gold ore is said to have been recently uncovered in this silver-lead mine at Capital City.

Ute & May.—It is reported that work will be resumed at these famous mines at Capital City.

Pride of America.—This mine at Capital City has recently developed into a shipper.

JEFFERSON COUNTY.

Independent Smelting and Refining Co.—Pyritic smelting is to begin at the plant of this company in Golden, August 15. Ore will be handled at the rate of 250 to 300 tons daily. The Colorado & Northwestern road in Boulder, Gilpin and Grand, and the Colorado & Southern road in Boulder, Gilpin and Clear Creek counties, have extended low rates upon certain classes of ore for the plant.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The tonnage in July was 70,000 tons of ore of all classes. Of this amount a little over 8,000 tons was zinc. The slight increase in the output came from the outlying districts.

Best Friend.—This mine at the head of Big Evans gulch, close to the Mosquito range, has opened a body of ore that runs gold 132 oz.; silver 312.7 oz., lead 16%. At the lower tunnel, which is in 1,160 ft., an upraise was started and carried for 125 ft. when the ore was found.

Grand Trunk.—At this group in the Holy Cross district operations have been resumed. The vein is of good size, carrying gold values and in it is a streak about 2 in. wide that runs from 2 to 6 oz. The upper tunnel is in 260 ft. and the lower one 2,060 ft. The property is equipped with air compressors, drills, cyanide mill, assay office and sawmill. The group consists of 7 patented claims and is owned by John W. Bailey, of New York.

Fanny Rawlins.—This mine at Breece Hill is under lease to T. D. Kyle and associates. Some high-grade ore is being shipped from small streaks. The lessees are prospecting for the main shoot. The ore that is at present being shipped carries values in gold, silver, copper and lead.

Golden Curry.—This mine in Sugar Loaf district is now on the regular shipping list and the ore going out is of very good grade. The Venture near the Curry is also shipping.

Coronado.—This shaft from the bottom level is now down 115 ft. and the mineral zone has been entered. It will be sunk to the Cambrian quartzite.

Ibex Co.—The lessees on this property shipped 1,500 tons of a very good grade of ore in July. Several more blocks of ground have been let out. The dump of No. 4 shaft is being shipped to the smelter.

OURAY COUNTY.

Security Gold Mining Co.—At the company's mines, 7½ miles east of Ridgway, the experimental mill is grinding on the conglomerate beds of Cobb gulch.

Senator.—A contract for 40 ft. of drifting has been let at this mine in the Sneffels district.

Camp Bird.—The assessments at this mine are being done by Thomas Johnson.

SAN JUAN COUNTY.

Silverton Mining Co.—This company at Silverton, operating the North Star and Sultan Mountain properties, are continuing the tunnel which is now in the mountain very nearly 2,700 ft., the area of 500 acres of mineralized ground owned by the company.

Hamlet.—Regular weekly shipments of ore from this mine at Silverton, to Durango, are being made.

SUMMIT COUNTY.

Senator.—The boiler and air compressor have been installed at this mine on North Star mountain, and it is expected that the plant will start operations at once.

Cashier.—A new ore zone is said to have been exposed at this mine at Breckenridge. Additional stamps in the mill are contemplated.

Monte Cristo.—Some changes have been made in the machinery at this mine near Breckenridge to adapt it to the ore.

Masontown.—The mill at this mine at 'Frisco is working steadily and good results are reported.

IDAHO.

BANNOCK COUNTY.

Inman Mining Co.—This company purchased eight claims on Rabbit Creek for $10,000.

BLAINE COUNTY.

Blue Bird.—This group of mines near Muldoon has been purchased by John Peterson from Charles Johnson and others.

IDAHO COUNTY.

Jumbo.—Plans for a cyanide plant for this mine at Hump are being perfected.

Liberty Bell.—Work will be resumed at once at this mine at Hump. Development work will be pushed. George Hedges is manager.

SHOSHONE COUNTY.

Powhatan.—At this group, three miles above Wardner, the ledge has been found to be about 40 ft. wide and thoroughly mineralized throughout.

Snowshoe.—The 1,000 ft. tunnel at this mine near Wallace has passed the 100 ft. mark.

Bullion.—This mine, on Sunset, has been bonded by Boston capitalists for $125,000 by James and John Callahan.

Bunker Hill & Sullivan Mining Co.—This company has bonded 28 mining locations in the Yreka mining district.

Mayflower.—This property, consisting of 11 claims, has been bonded to Pittsburg capitalists for $125,000.

Dobson Pass Mining Co.—An option on this company's property has been taken by W. J. Bracking for $50,000.

ILLINOIS.

FRANKLIN COUNTY.

Ziegler Coal Co.—This company has taken over the coal properties at Ziegler owned by Joseph Leiter. The strike of the miners is still in progress. The company is said to be practically owned by the Leiters.

FULTON COUNTY.

(*From Our Special Correspondent.*)

Maplewood Coal Co.—This company, George A. Ditewig, of Peoria, president and general manager, is preparing to sink another mine near Farmington on the Chicago, Burlington & Quincy Railroad, expecting to ship from 1,600 to 2,000 tons per day. The coal at that point is about 5 ft. thick and 120 ft. deep, with little or no impurities and a very good roof.

VERMILLION COUNTY.

(*From Our Special Correspondent.*)

Riola Mining Co.—This new company, of which J. H. Garaghty, of Chicago, is manager, is preparing to sink No. 3 mine. The three mines which the company expects to operate are on the Chicago & Eastern Illinois Railway near Westville; with the three Westville Coal Company mines now in operation or sinking, they will make six large mines in operation within a year and a half, under the one management which a year ago was only operating one.

INDIANA.

CLAY COUNTY.

(*From Our Special Correspondent.*)

Stunkard Coal Mining Co.—This company has filed articles of incorporation with the Secretary of State, with a capital of $10,000. It will open shafts and mine coal in Clay, Park, Vermillion, Virgo and Green counties. The principal office will be in Brazil. Walter M. Stunkard is president and Charles Stunkard secretary.

MARION COUNTY.

(*From Our Special Correspondent.*)

Oil & Mining Exchange.—An oil and mining stock exchange has been established in Indianapolis. Unlisted securities will be quoted and a market for them created, as has been done in other cities. Howard W. Lemon and Harry C. Ivor are the organizers and incorporators. The capital stock is $20,000. A call will be made three times a week.

VANDERBURG COUNTY.

(*From Our Special Correspondent.*)

Indiana-Leadville Mining Co.—This company, with a capital of $100,000, has been incorporated. It will do a general mining business in this and other States. The directors are Robert Burton, Jno. L. Iglehart, L. T. Iglehart and A. W. Iglehart, of Evansville, and Fred. A. Weber, of Lakeview, Idaho.

MONTANA.

LEWIS & CLARKE COUNTY.

Inter-Ocean Mining Co.—This company has secured control of a large area of property in Red Mountain, and will develop on a large scale. A tunnel has already been run in 600 ft. and will be continued to a length of 4,000 ft.

White Pine.—From this mine in Warm Springs gulch, near Helena, a shipment of silver galena was recently made that netted $500 per car. J. P. Schmidt and associates of Helena are the owners.

Red Bird Co.—A rich strike is reported at the Reliance mine of this company in High Ore gulch, near Helena.

MISSOULA COUNTY.

Denver & Rock Island Development Co.—This company, with a capital of $1,500,000, has been formed to take over the mines of the Duquesne Mining Co., recently sold at sheriff's sale. The incorporators are: Anton Lutz, Allegheny City, Pa.; John M. Patterson, J. A. Gartland, George B. Motheral, J. C. Bily and H. F. Gilg, of Pittsburg; B. F. O'Neil, Wallace, Idaho, and Colonel Thomas C. Marshall, Missoula.

POWELL COUNTY.

(*From Our Special Correspondent.*)

Gold Creek Placer Mines, Ltd.—This is an English corporation formed for opening one or more gold dredges on Gold Creek. It controls 2,500 acres of placer ground near the old placer town of Pioneer, and along Gold creek. The first boat is under construction and will probably be ready for work by October. The management claims that the results obtained in prospecting the ground will justify the erection of several boats. Prospecting has been done with a Keystone driller. Carl Bergstrand and Messrs Slatter & Clerage of Gold Creek have charge of the work.

SILVERBOW COUNTY.

(*From Our Special Correspondent.*)

Pittsburg & Montana Copper Co.—Crosscutting to connect shafts Nos. 2 and 3 is progressing as fast as possible. These shafts are 2,600 ft. apart, and they will be connected by a crosscut on the 1,200 ft. level. About 1,000 ft. have been driven. The work from No. 2 shaft is averaging 13 ft. daily. Two ledges of copper ore have been cut from shaft No. 3.

Nora.—This property belonging to F. A. Heinze is being reopened. It has been idle for two years. The claim is practically developed.

Belmont.—Three miners working in the shaft sinking on this property lost their lives through a sudden influx of water into the shaft, by the breaking of a bulkhead in the adjoining property. The mine is owned by F. A. Heinze and the Belmont Mining Company.

NEVADA.

ESMERALDA COUNTY.

Jumbo.—On the Vermilyea and Bartlett lease of this mine at Goldfield exceptionally rich ore is reported to have been found.

O. K. Fraction.—A rich strike is reported at this mine at Goldfield.

LINCOLN COUNTY.

Ryan.—An option on these holdings in the Pennsylvania mining district is reported to have been taken by J. Johnson, of Salt Lake City, for $36,000.

NYE COUNTY.

Old Reef.—Six claims at this place have been purchased by James M. Meighan and Joseph Josephs. A gasoline hoist will be installed.

NEW MEXICO.

GRANT COUNTY.

Chatham Copper Co.—This company's smelter in Silver City is in full blast. Most of the ore is the output of the company's mines, especially the Virginia.

Burro Mountain Copper Co.—The new concentrator at this mine in the Burro Mountains has started operations.

Colorado Fuel & Iron Co.—This company is shipping 15 cars of ore daily from the Hanover mining district to the smelter in Pueblo, Colorado.

SIERRA COUNTY.

Porter.—The mill at this mine at Hillsboro has been repaired and has resumed operations.

El, Oro.—Fire destroyed the shaft house, two hoists, and the mine stables at this mine at Hillsboro, July 26.

Empire Gold Mining & Milling Co.—The 20-stamp mill at this company's property at Hillsboro will be erected by September 1. Shipments from the Good Hope Bonanza are being made.

SOCORRO COUNTY.

Kelley.—This mine at Estey City has increased its output to 85 tons of high-grade lead-zinc ore a day. C. J. Brown, of Socorro, is negotiating for a new lease.

TAOS COUNTY.

Edison No. 5.—A lead of free milling ore is reported opened up at this mine at Anchor.

OREGON.

BAKER COUNTY.

E & E.—A cyanide plant for this mine at Sumpter is said to be contemplated.

North Pole.—The June clean-up at this mine at Sumpter is reported to be about $36,000. Machine drills are to be installed.

Oregon Power & Placer Co.—Operations at this company's mine at Sumpter are suspended on account of lack of water.

Red Boy.—It is reported that work is to be resumed by the reorganized company at this mine at Sumpter.

Snow Creek.—The monthly output on this group in the Greenhorn district is reported to average $20,000. The mill is now undergoing repairs.

Climax.—This group in the Cracker creek district has been bonded to a Michigan syndicate at a reported price of $100,000.

Blue Bird.—The 100-ton concentrator at this mine in the Red Bay district is nearly completed.

May Queen.—A mill is to be installed at this mine in the Red Bay district.

Snow Creek.—The mill at this mine in the Greenhorn district is undergoing repairs. It has been in continuous operation since last fall.

Buck Horn.—A strike in one of the 12-ft. ore bodies is reported in this mine at Sumpter.

Black Butte.—The quartz mill at this mine at Sumpter is nearly completed. A dividend of 3 per cent has been declared.

JACKSON COUNTY.

Lucky Bart.—This mine on Sardine creek has been leased to J. W. Hays and partners.

Schump.—This mine at Gold Hill has been taken on lease and bond by Robert Allison and associates.

Condor Power & Mining Co.—This company is constructing a steel bridge across the Rogue river at Gold Bay.

Hawkeye American.—This claim in the Willow Springs district has been sold to L. T. Pockman. Development work will begin at once.

JOSEPHINE COUNTY.

Takilma Smelting Co.—Machinery for the 100-ton smelter for this company's mine at Takilma has arrived and will be installed at once.

Black Butte Quicksilver Co.—A new furnace for the treatment of the cinnebar ores at this company's mine at Black Butte mountain is to be constructed. An adit is being driven at the 850-ft. level.

Great Northern.—A Huntington stamp mill is to be installed at this mine in the Blue River district.

Lewis & Clarke Mining Co.—Tellurium ore has been taken from the ledge of one of this company's claims on Cañon creek.

LINN COUNTY.

Santiam.—Work is to be resumed at these mines at Anidem. They have been idle for several years on account of the ill health of the owner, W. B. Miller.

YAMHILL COUNTY.

Red Jacket Mining Co.—A large portion of the underground workings of this mine on Trout creek has been lost through a cave-in below the 200-ft. level.

PENNSYLVANIA.

ANTHRACITE COAL.

Lytle.—This colliery, one of the largest in the Schuylkill region, has been purchased by the Manor Real Estate Trust Co., from the Susquehanna Coal Co. The reported price is $350,000. The colliery will be connected with adjoining lands of the Philadelphia & Reading Coal & Iron Co.

Pancoast Coal Co.—This company at Jermyn has resumed operations after an idleness of several months, caused by the destruction of its breaker.

Lehigh & Wilkes-Barre Coal Co.—The new breaker being erected by this company at Plymouth is nearly completed, and it is expected to be in operation by September 1.

Black Diamond Coal Co.—The breaker being erected by this company at Llewllyn is expected to be completed by September 1. It will have a capacity of 1,000 tons daily.

Delaware, Lackawanna & Western Co.—Suits for $200,000 have been brought against this company and the Scranton Coal Co. by the Diamond Land Improvement Co. for damages alleged to have been caused by refuse dumped in the Lackawanna river.

BITUMINOUS COAL.

Century Coal & Coke Co.—This company will erect 200 coke ovens on the property at Dunlap's creek, near Brownsville.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Saginaw Mining Co.—An ore treating plant is to be built by this company.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Puma Co.—Drifting has begun by this company on a large vertical vein immediately back of the cyanide annex to the stamp mill. The vein was discovered while excavating for the annex. The vein is 80 ft. wide.

Queen of the Hills.—A new vein of ore has been encountered at this mine.

Dakota Mining Co.—A steam hoisting plant has arrived for this company's shaft at Bald mountain.

Wasp No. 2 Co.—The Venture corporation has asked and received an extension of several weeks on the escrow calling for the Wasp No. 2 and surrounding mines in the Yellow Creek district. Thorough prospecting is to be continued.

Hidden Spanish.—This company owns 200 acres of ground, and work is to be resumed. A shaft has been put down 140 ft. equipped with a steel whim.

Golden Reward.—At the annual election of officers of this company, held in Deadwood, these officers and directors were chosen: E. H. Harriman, New York, president; Harris Franklin, Deadwood, vice-president and general manager; Charles C. Tegethoff, New York, secretary and treasurer; William Letson, Deadwood, assistant treasurer; Stuyvesant Fish, August Belmont, George W. DeWit, Henry W. DeForest, W. N. Devereux, Robert Goelet, all of New York. The company is treating 175 tons of ore per day at the cyanide plant in Deadwood.

Clover Leaf Mining Co.—For the year ending May 1, the company treated 27,200 tons of ore, which averaged nearly $5 a ton. Since May 1 the full capacity of the mill, 60 stamps, has been operated, averaging 3.5 to 4 tons of ore per stamp every 24 hours. A 3 compartment shaft was sunk on the hanging wall of the dipping vein. It is 4.5 by 14.5 ft. in the clear. There are 7 stations, pump stations being below the 3rd level. On the 400 ft. level there is a Prescott pump; 500 ft. level a Cameron sinking pump; the 600 ft. level, a Prescott duplex sinking pump; the 700 ft. level, a Prescott compound condensing pump. A small hoist will be installed at the 700 ft. level, double deck cages will be used, and timber framing and drill sharpening machines will be put in. The foundation has been laid for a 100 h. p. cross compound condensing engine.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Fairview.—The big vein in this mine has been encountered in the 4th level. An aerial tramway will be built from the mine to the mill.

Black Hills Copper Co.—Preparations are being made to continue the incline and drift west and east to develop two large copper bearing veins.

UTAH.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Blue Jay Extension.—A copper bearing ledge is reported struck in this property.

JUAB COUNTY.

Joe Bowers.—This property, at Tintic, reported in the Salt Lake market this week with 40,170 lb. of crude ore. The controls showed values of .02 oz. gold, 42.6 oz. in silver and 6.7% lead.

Mammoth.—This mine is shipping extensively. One lot marketed this week assayed $87 in gold, and 17.2 oz. silver.

Utah.—A lot of ore shipped during the week sold on controls showing 44.5% lead and 121.5 oz. silver. The company is completing the construction of its new boarding house.

Bullion-Beck.—Leasers working on the 1,300-level have opened a 10-ft. body of ore in new territory. A shipment showed values of 100 oz. in silver and from 18 to 20% lead.

PIUTE COUNTY.

(*From Our Special Correspondent.*)

Log Cabin.—Contractors are now installing an air compressor plant, preparing to drive the tunnel ahead.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Ohio Copper.—This company's property is reported opening into a big bonanza. The mine has been in possession of the present corporation less than a year. It was formerly known as the Columbia and was purchased for $125,000. An option has been given to an Eastern syndicate at $450,000. The winze being sunk from the Cunningham tunnel is reported all in high-grade ore, which is being shipped to the Salt Lake smelters. This ore carries from 15 to 18% copper.

South Columbus.—This company, at Alta, is using machine drills in driving an adit to cut the ledges which produced extensively near the surface years ago. The adit is completed for 450 ft. The first ledge of importance may be cut at about 600 ft.

Utah Consolidated.—An official estimates that the production of copper bullion from the smelter during August will aggregate 1,500,000 pounds. The shipments for the week ending August 6 aggregated 361,753 lb.

United States.—During the week ending August 6, 261,131 lb. of copper bullion were shipped from this company's smelter.

Bingham Consolidated.—The shipments of copper bullion during the week ending August 6 from this company's smelter aggregated 246,128 lb.

Alamo.—This Bingham group has been purchased by Col. E. A. Wall.

Yampa Smelter.—A second blast furnace is to be added at once, raising the capacity to 400 tons daily.

Utah-Apex.—The management of this Bingham mine is preparing to increase shipments. It is claimed no less than 400,000 tons of ore are blocked out.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

American Flag.—Shipments are being made to the Salt Lake smelters. An important find is reported on the 1,000-ft. level. A lot shipped gave returns of 258.8 oz. silver, 15.2% lead, 3.7% copper and $22.50 in gold.

Daly-West Mining Co.—This company on Aug. 5 declared the regular monthly dividend of 40c. per share, payable Aug. 15. This dividend will require $72,000. Reports had been current that the dividend would be reduced.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Honerine.—The mill is reducing about 250 tons of ore daily; making from 50 to 60 tons of concentrates.

Midas.—A shipment of auro-cyanides, representing the mill run for the last half of July, has been received in Salt Lake. It was valued at $3,500.

WASHINGTON.

OKANOGAN COUNTY.

Ruby Mountain.—Work has been resumed on the 15 claims at this place owned by John Baume, after an idleness of eight years.

Carbonate.—A strike of rich copper is reported on this mine at Carbonate.

WHATCOM COUNTY.

First Chance Mining Co.—The tunnel at this mine near Bellingham is in a total depth of 315 ft. Camp buildings and an assay office have been erected.

Mt. Baker & Yale.—The 10-stamp mill at this mine near Bellingham will soon be in operation.

International Gold Mining Co.—Machinery is being installed on this company's mine near Bellingham.

WISCONSIN.

WAUKESHA COUNTY.

Eagle Portland Cement Co.—It is announced that a mill costing $300,000 will be erected by this company at Eagle, 12 miles from Waukesha. The deposit of marl which exists there is pronounced by the engineers and experts to be one of the most valuable in the United States.

WYOMING.

LARAMIE COUNTY.

Sunrise.—It is reported that the Colorado Fuel & Iron Co. has purchased these iron mines in the northern part of the county, for $500,000. The company has hitherto leased the property which comprises about 10,000 acres.

FOREIGN MINING NEWS.

AFRICA.

RHODESIA.

The gold production of the mines of Rhodesia in June is reported at 20,402 oz. bullion. For the six months ending June 30 the total was 113,497 oz. bullion, against 117,932 oz. in the first half of 1903, showing a decrease of 4,433 oz. The total bullion this year was equal to 101,012 oz. fine gold, or $2,088,917 in value.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending July 30 aggregated 13,625 tons; for the year, 457,891 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for week ending July 30 were as follows in tons: Le Roi, 1,500; Centre Star, 1,800; War Eagle, 1,230; War Eagle (milled), 120; Le Roi Two, 480; Le Roi Two (Elmore), 300; Spitzee, 30; Kootenay, 350; Jumbo, 450; Cliff, 30; Velvet-Portland (milled), 250. Total, 6,540. Total for the year, 206,953.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Co.—This company reports 259,355 tons of coal mined in July. For the five months of the fiscal year from March 1 to July 31 the total output was 1,379,913 tons coal.

MINING STOCKS.

(Full quotations given on pages 247 and 248.)

New York. Aug. 10.

The market has been very quiet. There has been nothing to encourage speculation; and the prospect of heavy gold exports and dearer money tends in the opposite direction.

Amalgamated Copper sells around $52, with no heavy transactions. The other copper stocks show very little trading. Industrials are dull. United States Steel common brought $11⅞@$12, with the preferred at $59.

The Comstocks are dead for the present, with very few sales. There has not been much doing in Cripple Creek stocks, notwithstanding the better prospects.

Boston. Aug. 9.

(*From Our Special Correspondent.*)

There have been no unusual happenings in this market during the past week Prices sagged for a day or two, but have recovered. As a rule mining shares are firm and no effort is being made to bring about any decided activity. Persistent selling of Shannon copper forced the price down to $4.25, from which it recovered to $4.87½. The selling is traced to two of the original promoters, whose 50,000 shares of stock was received as compensation for the property and promotion. Manipulation has also been quite apparent in the stock. The July production was 992,000 lb. copper, and net earnings amounted to $27,000. Isle Royale, which has been quiet of late, spurted $2 to $12.62½ on the improved prospects in and around the property.

A splurge was made in Utah Consolidated last week, and on quite heavy trading the price reached $39.25, but it is now almost $1 below this. Reports of a deal with the Amalgamated are rife, but nothing definite is known. Amalgamated people are known to be large owners of Utah stock.

Copper Range settled to $52.50, but recovered to $55.50, with the close $54.25. There are no new developments at this property, but there has been quite an investment demand since the Lawson advertisements. Daly-West has been more or less conspicuous, and after advancing fractionally to $14.75, broke to $13.25. The fact that the regular monthly dividend of 40c. was declared had no effect whatever on the stock. Reports were current before the declaration that the dividend would be cut to 10 or 15c. per quarter. Letters from the management, in answer to stockholders' inquiries, report favorably on the mine.

Wolverine mining is up to $80 on small investment buying, and Atlantic is up $1.62½ to $9.75 on light offerings and a better demand. Allouez is fractionally higher at $8.75. The advance of the latter is due to the discounting the time when the Kearsage lode will be clipped; sometime next month, it is expected. Calumet & Hecla has been strong around $480, and there has been a fair demand for the stock. United States Mining continues in fair request around $22. Guanajuato Mining 7% debentures are off about $15 to $55.50 on the outside market.

It is learned that Boston capital is seeking investment in Shasta county, Cal., mining property. The Mammoth property has been purchased by people identified with the United States mine and the Balakala by people interested in the Bingham. The former is north of Lawson's Trinity and the latter south of it.

Colorado Springs Aug. 6.

(*From Our Special Correspondent.*)

The market during the past week on the local exchange has been very satisfactory, with heavier trading, although prices have not materially changed, with one or two exceptions. The annual financial statement of the Exchange shows the organization to be self-supporting, with interest on loans and rents sufficient to have made it unnecessary to collect any dues from members for the past 18 months. Money loaned, together with good real estate, amounts to $100,000.

The output from the Cripple Creek district for July amounted to $1,714,000, which is about $100,000 in excess of June. This is very satisfactory, in view of the fact that the Portland has been running light, and with the Independence closed practically all the month. The Independence directors have approved the leases granted and this property will be active again in a very short time. More leasing is now being done in the camp than for several years, which means more extensive development and more new discoveries.

Work has been unusually active this week, advancing to 10c., with heavy trading. El Paso has held well up to 90c. all the week. Elkton closed at 64c.; C. C. Consolidated at 8¾c.; Isabella at 21c.; Portland, $1.59@$1.70; C. K. & N., 32⅛@35c.; Vindicator, 68c. per share.

Salt Lake City. Aug. 6.

(*From Our Special Correspondent.*)

There is still little life to mining stocks. The hottest weather of the summer has been experienced during the past week, and many brokers and their clients are off on their summer vacations. The week closed, however, with some stocks in better shape than they were a fortnight ago. Daly-West, which has suffered some severe reverses lately, has recovered some of its lost ground, but the stock is several dollars short of where it was selling. The company will pay the usual dividend of 40c. a share, or $72,000, on August 15. An effort has been made to bear Columbus Consolidated, but it has met with little success. The directors of the company will meet during the coming week to levy an assessment of 20c. a share, which will bring into the treasury of the company $60,000. With this amount the corporation will pay off its indebtedness and have a surplus left in the treasury. There has been some selling of Daly at an advance. Daly-Judge is also in better form.

The trading done in the lower priced stocks was due in a large measure to brokers filling their shorts. Consolidated Mercur sold up to 40c. a share, but afterwards weakened.

San Francisco Aug. 4.

(*From Our Special Correspondent.*)

Trading in the Comstocks has been rather quiet, and prices were somewhat weaker, especially for the North End shares. The exchange seems to have settled down into summer quietness.

Some quotations noted were: Ophir, $2.25@$2.30; Consolidated California & Virginia, $1.15; Mexican, 80@83c.; Exchequer, 50@55c.; Sierra Nevada, 22c.; Chollar, 14c.; Gould & Curry, 11c.; Crown Point, 11c. per share.

On the San Francisco and Tonopah exchange business has been of somewhat less volume, but there was still an interesting market, with a fair demand for stocks. Montana Tonopah brought $2.40@$2.45; Tonopah Belmont, 70c.; MacNamara, 50c.; Tonopah Gold Mountain, 19c. per share.

On the California exchange business in oil stocks was dull, and very little doing. Prices were accordingly rather weak. Reed Crude sold at $1.70; Home, $1.30; Sovereign, 40c.; Monarch, 24c. per share.

Monterey, Mexico. Aug. 6.

(*From Our Special Correspondent.*)

Exchange on New York remained at $2.14½ during the week until Saturday, when it raised to $2.15 and was more active. The government has announced $2.20 as its basis for duties during August, and $214.87, or $1,451.27 Mexican per kg., as the value of gold bullion.

Mining stocks were somewhat livelier, and of El Oro mines Victoria brought $40; Alde-

baran, $58; Dos Estrellas, $1,985; Maria del Oro, $25; and Equidad, $19. Trinidad, Charcas, San Luis Potosi, brought $5; Santa Maria de Guadalupe, Zacatecas, $105. In Pachuca, Jesus de Monte, brought $19; Union, $3; San Francisco, $81; Santa Gertrudis, $78; and Soledad, $830 per share.

COAL TRADE REVIEW.

New York, Aug. 10.

ANTHRACITE.

Generally speaking, the anthracite coal trade is now experiencing a period of midsummer dulness. This period used to be a regular feature of the trade, but was thought to have dropped into innocuous desuetude when Mr. Morgan, Mr. Baer and others put into effect the present system of graded discounts for spring and summer buying. It now seems likely for the next few years midsummer dulness will be with the coal trade again, and that certain prophets of an industrial millenium will be put to confusion.

The shipments in July were 4,623,227 tons. So dull is trade at present and so heavy was production during the first seven months of this year—the shipments from the mines amounting to 33,880,434 tons, compared with 37,262,447 tons in 1903—that production will undoubtedly be much curtailed for a month or more; that is, until the regular fall buying starts in September and October. This policy of curtailment is already being enforced, and has given rise to some wild rumors, one press dispatch from Wilkes-Barre recently saying that all companies operating about that city had closed their mines for a week. It appears, however, that the only large companies in the whole anthracite region that closed all their mines for the week were the Philadelphia & Reading and the Lehigh & Wilkes-Barre, though it is stated that the Lehigh Valley will close its mines in the week beginning August 15. The mines controlled by the Pennsylvania Railroad Co., and by the Erie, the Delaware & Hudson and Delaware, Lackawanna & Western railroads, and by Coxe Brothers, worked, and are working, according to the market demand; that is to say, mines are closed here and there for repairs or alterations, while others work on short time. Production is considerably curtailed, but there has not been, nor is there likely to be, any general shut-down of collieries by the large companies.

Trade in the Northwest is quiet; considerable anthracite is arriving at docks at the head of the lakes. In Chicago territory the market is generally dull and overstocked, but agents of one or two compenies report a good seasonable demand. Along the lakes and in Canadian territory receipts are not as heavy as they were. Along the Atlantic seaboard trade is quieter than at any time this summer. Sales agents, however, seem to anticipate a better fall demand when the vacation season is over than last year, as fewer householders laid in early supplies this year than last.

Retail dealers are not pushing sales, as, with their yards filled with coal bought at spring prices, they will make money by letting consumers wait until cold weather compels buying at winter prices. The steam sizes are not accumulating on consumers' hands as fast as they were, as many washeries are closed or are on part time, and producers are regulating shipments to meet contract orders.

BITUMINOUS.

The Atlantic seaboard bituminous trade is quiet, though there are reports from several quarters of better business, and producers of certain poorer grades of coal are refusing the prices that have been offered, and holding for advances of 10@20c. on the lowest figures taken recently.

It is understood that there has been a meeting of producers in the Pocahontas and New River fields, at which minimum prices were agreed on, thus preventing any farther disorganization of the trade from that direction. The minimum established is said to be $2.45, f. o. b. Norfolk and Newport News. There has also been a meeting of the Seaboard Carriers' Association, which includes most of the large vessel owners engaged in coastwise coal traffic, at which, it is understood, an agreement was made to continue the previously established minimum restrictions on vessel charters, this minimum being a rate of 90c. around Cape God from the principal loading ports, with limited laydays for loading and discharging 10 to 16 days, according to the size of vessels. It is understood that many vessels in the Association have taken offshore business, or have been tied up.

Trade in the far East is a little dull, probably on account of blockades at certain ports where vessels have not been able to unload coal as fast as they arrive, causing large demurrage bills. Along Long Island sound business is somewhat stronger, and consumers are taking a little more coal. At New York harbor points producers are holding for better prices. All-rail trade is reported improving; most orders are coming in, and prices are stronger. Transportation is up to all demand.

Car supply at the mines is very good, the main lines permitting their own cars to go to points on foreign roads heretofore embargoed. In the coastwise vessel market vessels are not in as good supply as they were. We quote current rates from Philadelphia as follows: Boston, Salem, Portland, Portsmouth and Bath, 75@80c.; Lynn and Newburyport, 85@90c.; Gardiner, 90@95c. and towages; Bangor, 90c.; Providence, New Bedford and Long Island sound, 60c.; from New York harbor points rates are 55@60c. to points beyond Cape Cod, and from Norfolk and Newport News about 90c., with limitations on the number of days for loading and discharging.

Birmingham. Aug. 8.

(From Our Special Correspondent.)

The commercial coal operators who signed a temporary contract with the miners' organization and the non-union mine operators in Alabama are finding a ready sale for all the coal they can produce. The strike of the union miners has been felt by the iron manufacturers with the exception of the Sloss-Sheffield Steel & Iron Co., which has had all needs supplied by its convict and non-union mines. Coal prices are holding up well by reason of the strike. Miners working under a temporary contract are contributing $1 per week to the strike fund and with what is in the district organization treasury and financial help from the national organization of the United Mine Workers of America, the strikers are being assisted along. During the past week it developed that the Alabama Consolidated Coal & Iron Co. had offered a compromise contract, but the miners would not accept. A temporary contract at the old scale was afterwards signed by the Alabama Consolidated. There have been rumors that the Tennessee Coal, Iron & Railroad Co. and Sloss-Sheffield Co. will make effort to start up their mines with non-union labor, but so far there has been no attempt made in that direction. The miners in the Blue Creek region, in the southern portion of Jefferson county, have been notified again to move out of the houses, but the notice gives until September 1.

The Clifton Coal & Coke Co. has been incorporated in Mississippi, capital stock $100,000, fully paid in, the object to buy, sell and transport coal from Alabama mines to points along the Mississippi river from Greenville, Miss. George Clifton, of Greenville, Miss., is president and general manager; T. R. Foster, of Vicksburg, Miss., vice-president and assistant general manager, and W. H. Clements, of Greenville, secretary and treasurer. Steamers and barges will be purchased and coal from the Alabama mines handled in quantity to towns along the Mississippi as far as New Orleans.

There is still coal and coke being brought into the State from West Virginia, smaller furnace interests purchasing these products with which to make iron.

Chicago. Aug. 8.

(From Our Special Correspondent.)

There is no decided change in the general condition of the coal market, for either anthracite or bituminous. The demand continues to be below the supply on all grades of coal, and to all appearances will so continue until the cool weather of autumn increases it. Despite efforts of wholesalers to dispose of anthracite without clogging transportation, the public refuses to buy until it shall need the coal, and retailers are not disposed to load their bins as heavily as last year. The first week in August, however, is a dull week at best, and nothing like activity is looked for until the last of the month, when, under the stimulus of a 10c. reduction in the discount, the consumer may be expected to lay in something of his winter stock. Dock stocks, while not so large as they were at this time last winter, have increased steadily and are now large enough to make it practically certain that the supply for the winter will be sufficient to meet all demands.

Western run-of-mine and screenings are in light demand, though forming the bulk of the business now being done in bituminous. The packing-house strike is affecting this trade, though not so much as was apprehended at the start of the strike. Threshing coal is somewhat quieter, on account of delay in harvesting the crops, due to cold weather. Smokeless is weak and the $3 price is being cut as much as 20c, according to reports. There is evidently too much smokeless in the market and cutting is general. Hocking is in slightly better demand and is steady at $3. Indiana and Illinois bring $1.35@$1.75, and screenings $1.10@$1.50. There is a general increase in the demand for railroad coal tending to stiffen the market for the better grades of western.

Cleveland. Aug. 9.

(From Our Special Correspondent.)

The coal situation in Cleveland has not changed. There is a sentimental improvement, but nothing substantial. In one or two instances reports are abroad of small coal companies having sustained considerable loss, but in the main the companies have been moving along pretty steadily. The situation does not permit of any statement of extravagant earnings from coal sales, but the companies have been keeping above the dead level of loss. The movement of steam coal has been steady, and in some instances buyers are talking of contracting, but have not done so as yet. The prices are about even at 90@95c. at the mine in both the Pittsburg and the Ohio territory. The price of slack is also steady, but at the bottom. The quotation now is 25c. at the mine from all territories. In some instances contract prices are being held up but in one case an inquiry for 30,000 tons brought out a price of 50c. There is also talk of a lower price, but it seems that the peculiar conditions at the mine making the offer induced it to get rid of its slack at bottom price in order to keep it moving. The lake conditions have not changed as to the volume of business or the rates. The coke situation is a little stronger. Buyers are covering their needs now for some time ahead. The best grades of foundry coke are selling at $2. The cokes which are not quite so well known are selling at $1.85@$1.90 at the oven. The best furnace cokes are selling at $1.55. Some others are selling as low as $1.45, at oven.

Pittsburg. Aug. 9.

(From Our Special Correspondent.)

Coal.—There is no change in market conditions and the mines continue in full operation in both the river and rail fields. There is no lack of railroad cars and heavy shipments are being made to lake ports. The price is firm at $1@$1.10 for run-of-mine coal at the mines. This week the Pittsburg-Buffalo Co. completed plans for opening eight new mines in the Pittsburg district, the majority of the territory being in Washington county and estimated to contain 135,000,000 tons of coal. A railroad will be built, 10 miles long, connecting the mines and having connection with the Wabash, Baltimore & Ohio, Pittsburg & Lake Erie, and Pennsylvania railroads. Application has been made for a charter for the new road which will be called the Washington & Green railroad. The mines will have steel tipples and

modern equipment and when in full operation will add 4,000,000 tons annually to the capacity of the company.

Connellsville Coke.—The production declined during the week, owing to the blowing out of 700 ovens by the H. C. Frick Coke Co. Prospects for the coke trade are much improved, as a number of furnaces are making contracts on account of pig iron orders just booked. Standard Connellsville furnace coke is held at about $1.45 for early delivery, but on contracts running the rest of the year $1.50 is the minimum. Standard Connellsville foundry coke is quoted at $1.75@$1.85, and even higher in the case of small lots. According to the *Courier's* weekly report the production for the week was 154,984 tons, compared with 157,440 tons the previous week. The shipments aggregated 8,252 cars distributed as follows: To Pittsburg and river points, 3,332 cars; to points west of Pittsburg, 3,935 cars, to points east of Connellsville, 985 cars.

San Francisco Aug. 4.

(*From Our Special Correspondent.*)

The coal market shows no change, either in demand or prices. Arrivals have been fair.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

Foreign Coal Trade Aug. 10.

There is nothing new here in export trade. About the usual business with the West Indies is being done. The recent inquiries for export to Europe do not seem to have developed into any serious trade.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of July 30, that the market continues unchanged with little business doing. Quotations at Cardiff are: Best Welsh steam coal, seconds, $3.66; thirds, $3.48; dry coals, $3.30; best Monmouthshire, $3.42; seconds, $3.24; best small steam coal, $1.98; seconds, $1.80; other sorts, $1.56.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthsire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The freight market remains unchanged and easy. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.20; Naples, $1.14; Las Palmas, $1.32; St. Vincent, $1.44; Rio, $2.04; Santos, $2.46; Buenos Aires, $1.74.

IRON TRADE REVIEW.

New York, Aug. 10, 1904.

At last, after long waiting, there seems to be some improvement in the iron market, although it is irregular, and not apparent in all lines. It is most marked in raw material, the demand for pig iron showing an increase, while there are signs that the decline in prices may have come to an end, although there is no marked advance to be noted. At any rate, buyers are more inclined to make contracts ahead, and deliveries on standing contracts are in somewhat better demand.

In steel billets there has been some commotion over a large contract made in the Pittsburg district, the details of which are given in our Pittsburg letter. From this it appears that the contract covers the conversion of 110,000 tons of pig iron into billets, and that the price of the latter works out at $19.25 Pittsburg, which is considerably below the Association price. The Billet Association is meeting in Pittsburg to-day, but we have no detail of its action.

In finished material the only signs of special activity shown have been in bars and plates. Structural material is still very quiet, the only demand being an irregular one for lots for immediate delivery.

The attempt to maintain prices, which has not been especially successful, has resulted in independent concerns getting most of the new business going. Whether this fact will be recognized by the principal producer remains to be seen.

Birmingham Aug. 8.

(*From Our Special Correspondent.*)

There is not much change in conditions of the pig iron market in this section. There is still a very fair demand for the product, and prices are firm. Some of the companies manufacturing iron have not been overanxious to find business, their order books presenting a good condition. The Woodward Iron Co. has been out of the producing list for two weeks and longer. The little furnace of the Tutweiler Coal, Iron & Railroad Co. is again making iron. The Tennessee Coal, Iron & Railroad Co. has five furnaces in operation at Ensley. The Republic Iron & Steel Co. has one of the three furnaces at Thomas in full operation. The Alabama Consolidated Coal & Iron Co. is also out of the producing, but will resume before the end of the week, while the Lacey-Buck Co.'s furnace is making a fairly good quantity of iron. The Sloss-Sheffield Steel & Iron Co. still reports six out of its seven furnaces in operation.

The Tennessee Coal, Iron & Railroad Co. is manufacturing considerable basic iron at Ensley furnaces, the same being used in the steel plant adjacent. Foundry and forge irons are being produced at the other plants in operation in the district.

The following pig iron quotations are given hereabouts: No. 1 foundry, $10; No. 2 foundry, $9.50; No. 3 foundry, $9; No. 4 foundry, $8.50; gray forge, $8@$8.25; No. 1 soft, $10; No. 2 soft, $9.50.

The cast iron pipe plants in this section are working hard to keep up with their demand. The statement is made again that southern cast iron pipe makers have orders on hand which will keep them busy for some time to come, if not through the balance of the year. Good prices prevail for cast iron pipe.

The conditions at the rolling mills show no change. The plate and bar mill departments at the Bessemer rolling mills are still being operated with non-union men, and the production is satisfactory, everything considered. This is the only mill in the district in operation.

Chicago. Aug. 8.

(*From Our Special Correspondent.*)

The pig iron market is apparently bullish; both southern and northern hold up stiffly to the prices of last week, and on many sales there is an advance of 25c. It is said by agents that the advance in southern is due to the feeling of the furnace proprietors that the market will justify an increase of prices, but doubt is expressed by the conservative element of the sellers as to the ability of the producers of Southern to hold up to the new figures. The comparatively heavy buying—100% more than it was a few months ago—is ascribed by the conservatives to the needs of the agricultural implement trade, which is not a constant demand and already is falling off. Other sellers express the belief that the upward climb has come for good. The fundamental fact, however, appears to be in the local market that consumption is still greatly under the normal, and foundrymen express no confidence in their being able to increase their output soon. Under these circumstances, it would seem to be too early for sellers of iron to feel assured that they can advance the price materially.

Quotations to-day are $9.25@$9.50, Birmingham, for Southern ($12.90@$13.15, Chicago), and $13.25@$13.50 for northern. The increase in northern sales is probably greater than in southern. Sales are running into the first quarter of 1904 freely, sellers seemingly having recovered from their timidity in this regard, and there are buyers who seek iron up to the first of next July. A notable feature of the improvement in the market is the fact that few users of iron are asking that shipments be held back now.

Coke is much stronger, and has been somewhat scarce in the last week. Connellsville brings $4.65@$4.85 per ton.

Cleveland. Aug. 9.

(*From Our Special Correspondent.*)

Iron Ore.—The market has been unchanged, but steady. The prices are now about at rock bottom for this year. The small buying which is done to piece out former orders, is without regard to the price, that having ceased to be a matter of contention. The movement is free and the tonnage available is abundant. It is indicated by the fact that the rates of carriage have sagged to 70c. from the head of the lakes; 60c. from Marquette and 50c. from Escanaba, the lowest rates which have been paid in years.

Pig Iron.—The buying in foundry has been improved. Foundrymen are taking little heavier lots for immediate shipment, and are also more free with their purchases for the remainder of the year. The indication is of an improved demand to the point that some of the furnaces are talking about resuming operations which were suspended a short time ago. The prices have stiffened. Talk of $11.50 No. 2 iron is not heard except upon occasions where the demand is for iron which is below the base analysis. There is some talk, too, of heavy buying in malleable. This is in better demand for immediate shipment, but is not strong on future delivery, except where some of the furnaces are willing to make a good concession as to price. Present shipments are made at $12 at the furnace. Future delivery, running as far as a year ahead, is made at $12.50@$12.75 in the Valleys. Bessemer and basic are under inquiry, with prospects of a good movement soon, but as yet nothing has been done.

Finished Material.—There is a better sentiment in the market, probably due to changed and bettered conditions in the East. The market finds a little heavier buying for immediate delivery, but in this territory the contract stage has not been reached as yet. The best buying is in bars. The Empire mill, the last of the bar iron mills in this territory to resume, started again Monday after a three-weeks' suspension. The market is now more active, although prices are a little weaker, 1.30c. at the mill being quoted.

There has been talk of a cut in the prices of steel billets. The smaller mills are getting the bulk of the business on a reduction of $1 to $1.50 below the association price of $23.50, Cleveland. There is a little greater activity in structural shapes and improvement in the movement of plates.

New York. Aug. 10.

Pig Iron.—The local market shows improvement, orders having increased notably. For northern iron we quote: No. 1, foundry, $14.50@$15; No. 2X, $14; No. 2 plain, $13.50; forge, $12.50@$13. For southern iron on dock prices are about as follows: No. 1 foundry, $13.50@$13.75; No. 2 foundry, $13 @$13.25; No. 3 foundry, $12.50@$12.75; forge, $12@$12.25; No. 1 soft, $13.50@$13.75; No. 2 soft, $13@$13.25.

Bar Iron and Steel.—The market continues dull. Refined bars are quoted at 1.45@1.49c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c. per pound.

Steel Rails.—Quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

Structural Material.—The local situation in the building trade continues unfavorable, and until labor leaders are more reasonable in their demands there is not likely to be much improvement. Large lots at tidewater are still quoted nominally at 1.75@2c. for beams, angles and channels.

Philadelphia. Aug. 10.

(*From Our Special Correspondent.*)

Pig Iron.—The recent spurt in iron in some sections scarcely made a ripple on eastern and middle Pennsylvania trade. The outcome of this week's New York meetings is awaited

with interest, though pig iron may not be directly affected. Anything seems to alarm the trade these days. None of our brokers or furnace agents claim to have done much business. Certain large interests are making estimates of requirements for the future, but, as far as can be found out, with no idea of contracting ahead at present. After all the restriction we have had, prices have not been affected one way or the other. Quotations are about as follows: No. 14 Foundry, $15; No. 24, $14.50; No. 2 plain, $13.75; forge, $13.25. Southern No. 2, $14, by rail; basic, $13.

Steel.—Every possibility of getting contracts from billet consumers is side-tracked. Large consumers here say billets must come down. Even small buying has stopped, although deliveries are going on actively on old $24 contracts.

Bars.—The only buyers this week are the country store trade, and they are taking considerable material. All mills are anxious for business. Quotations, 1.50@1.60c. for refined.

Sheets.—This branch holds up well. Mill people report fair orders, sprinkled with big ones; nearly all stock going into local consumption. The outlook is good, and prices are firm but low.

Pipes and Tubes.—Merchant pipe is picking up. Boiler tubes are very dull, but the mills refuse to change their discounts.

Merchant Steel.—Some merchant steel orders have been secured in our territory under the assurance of protection against a decline. Quotations unchanged, and prices strong in retail lots.

Plates.—Our plate people report a gradual improvement in small orders and two or three inquirers for big lots. Quarter-inch tank is 1.78½c.

Structural Material.—Local building requirements are quite encouraging this week, but the big railroad bridge business is as remote as ever. Quotations, 1.73½@1.85c.

Scrap.—Scrap is beginning to move, particularly machinery scrap, at $12, and No. 2 forge fire scrap at $9. Choice No. 1 railroad is being offered at $13.50, but no important sales can be heard of.

Pittsburg. Aug. 9.

(From Our Special Correspondent.)

The week has been the most active in pig iron transactions this year, except, possibly, the week in February, when the United States Steel Corporation made its purchases. A record of the business done, including adjustment of old contracts, shows that western Pennsylvania and Ohio furnaces have sold fully 250,000 tons of pig iron for shipment extending over periods ranging from two to ten months. Firmer prices have been established by the deals just closed, indicating increased confidence in the future, and there is now no probability of a decline in the prices of pig iron. Lower quotations are being made in some of the finished lines, but it is generally conceded that the low point has been reached in pig iron, and the prospects are that trade will steadily revive, and the outlook is unusually encouraging for a heavy business next year. The contract placed by the Pittsburg Steel Co. for 110,000 tons of bessemer steel billets with the Republic Iron & Steel Co., on a conversion deal, included the purchase by the company of 50,000 tons of bessemer pig iron from the Bessemer Pig Iron Association; 35,000 tons from other Valley furnaces, while 25,000 tons will be furnished by the Republic Co. The price of the iron is $12, Valley, and the conversion price is $6 a ton. The freight rate from the Republic's works to the Pittsburg Steel Co.'s plant at Monessen is $1.25 a ton, which makes the price of the billets $19.25, delivered, or $3.75 under the billet price established by the association. Deliveries are to be made within the next ten months. An adjustment which involves a tonnage estimated at between 50,000 and 80,000 tons of bessemer pig iron has just been made between a merchant furnace interest and the Republic Iron & Steel Co. It provides for the resumption of shipments on an old contract. Valley furnace interests also sold 25,000 tons to the Wheeling Mold & Foundry Co., and about 30,000 tons to a Buffalo foundry, both contracts being on Pennsylvania railroad tunnel work, and calling for bessemer iron, with the option of a change in specification making the iron slightly different from standard bessemer. The Wheeling contract was at a price a trifle below $11.75, at the furnace. There were a number of other sales of pig iron during the week amounting to about 15,000 tons. The Valley furnaces are now quoting $12.25 at furnace for bessemer, and some are asking $12.50.

There is a slight improvement in the steel market, and several additional mills in the valleys have been put in operation, several in Youngstown having been started yesterday. Prices are somewhat firmer, and it is believed the cut in tin plate prices made by the American Sheet & Tin Plate Co. early last week soon will be restored. A reduction in prices of wire nails and wire products is reported, but no official announcement has been made, strict secrecy being observed as to the action. The cause for withholding an official announcement is the fact that there has been no actual cut, as the "secret" price is now the "open" price. A meeting of wire interests was held at Chicago last Thursday, at which it was decided to quote wire nails at $1.80 and plain wire at $1.70. These prices are $2 a ton less than former quotations, but are the prices at which the products have been selling for some time past. The merchant bar interests anticipate an active market next month, which time usually marks the opening of the agricultural implement makers' season. Merchant pipe is in better demand this week, and prices are firm. Sheets show some slight improvement. Another contract for structural steel is to be awarded this week, and will be placed in the Pittsburg district. It will be for four buildings of the new Driggs-Seabury Ordnance Co., of Sharon, which has given the contract for the erection of the buildings to William B. Scaife & Sons.

A meeting of the billet pool is being held here this afternoon, and there is considerable speculation as to what action will be taken regarding the acceptance of the order for 110,000 tons of billets from the Pittsburg Steel Co. by the Republic Iron & Steel Co. A report was circulated to-day that the pool would be disrupted, but this is not credited. It is admitted, however, that the Republic's action has disturbed conditions somewhat, and an investigation has been ordered. The meeting is secret, but it is known that a number of pig iron makers have been consulted by members of the billet pool as to prices, and it is believed a thorough investigation is being made of all reported conversion deals.

All the wage scales of the Amalgamated Association of Iron, Steel & Tin Workers have been adjusted for the year, except the iron scale, which may be taken up some time this week. Pending negotiations between the association and the Republic Iron & Steel Co., the mills are operating under last year's scale. The conference committees failed to agree at all previous meetings, and the question will go to a board of conciliation. The delay was caused by difficulty in getting men to serve on the board, but it was announced to-day that Henry W. Heedy will serve for the company, and Benjamin Davis, of Birmingham, Ala., for the association. These two men select a third, and will begin hearing arguments of both sides at an early date. The Republic Co. wants the base for puddling reduced from $5 to $4.50, and a cut in the finishing scale averaging about 15%. The association insists on a continuance of the old scale.

Pig Iron.—Prices are much firmer and higher this week, the heavy tonnage for which contracts have just been closed having stimulated the market considerably. Southern iron is reported to have advanced 25c. during the past few days. Contracts for northern iron placed within the past week exceed 250,000 tons. Quotations are now given as follows: Bessemer, $12@$12.50, Valley; foundry No. 2, $12.75@$13, Pittsburg; gray forge is firm at $12, Pittsburg.

Steel.—The market is in fairly good shape. It is impossible to buy sheet bars at less than the association price of $24. The $23 price for bessemer and open-hearth billets is being maintained for ordinary lots, and is only disturbed by the competition of the smaller mills. Most of the large consumers are getting their steel on old contracts at a cost of from $19 to $20. Steel bars are still quoted at 1.35c., and a good business is expected next month. The plate mills are operating about one-half capacity, but the price of 1.60c. for tank plate is being well maintained.

Sheets.—There is an improvement in tonnage and some mills are sold up for two or three months ahead. Black sheets No. 28 gauge are firm at 2.10c., and galvanized sheets are quoted at 3.10@3.15c.

Ferro-Manganese.—There is no change in price, the leading producer continuing to quote $41.50 for 80% domestic.

Cartagena, Spain. July 30.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Shipments for the week were two cargoes, 5,250 tons dry ore, to Great Britain. The market continues to be very much depressed.

Quotations are now as follows: Ordinary 50% ore, 6s. 3d.@6s. 6d.; special low phosphorus, 6s. 9d.@7s. 6d.; specular iron ore, 58%, 9s.; magnetic ore, 60%, 10s. 9d. for lumps and 8s. 9d. for smalls; manganiferous ores range from 9s. 3d. for 12% manganese and 35% iron up to 14s. for 20% manganese and 20% iron.

Pyrites.—Iron pyrites, 40% iron and 43% sulphur, are quoted at 10s. per ton. No shipments for the week.

CHEMICALS AND MINERALS.

New York, Aug. 10.

The market for heavy chemicals is generally quiet. Recent advances for high-test domestic alkali and caustic soda are firmly held.

Cyanide.—Prices continue easy, 18@19c. per lb. f. o. b. New York being quoted, although a shade less would doubtless be accepted on a large contract.

Bleaching Powder.—Forward inquiry continues fairly good at regular contract prices—$1.20@$1.25 per 100 lb. for prime brands.

Copper Sulphate.—New orders are rather more numerous; the quotation, $4.75@$5 per 100 lb., remains unchanged.

Acids.—There is nothing further to be heard about the proposed advance in nitric acid. Trade is rather quiet in most lines.

We quote below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, com'l	$5.10@$5.50
Muriatic, 20°	1.60	Sulphuric, 50°,	
Muriatic, 22°	1.75	bulk, ton	13.50@14.50
Nitric, 36°	4.50	Sulphuric, 60°,	1.05
Nitric, 38°	4.75	bulk, ton	18.00@20.00
Nitric, 40°	5.00	Sulphuric, 66°,	1.20
Nitric, 42°	5.50	bulk, ton	21.00@23.00

Brimstone.—Quiet. Shipments of Sicilian best unmixed seconds are quoted at $21.625@$21.75, and sales of domestic have been made at about the same price. There is still a good deal of talk about the supplies of domestic sulphur.

Pyrite.—Further sales of Spanish washed ore are reported at 7¼@8½c. per unit; of unwashed fines at 9½@10c. Non-arsenical ore continues in demand at 12@13c. per unit of sulphur, and domestic lump ore at 10@10.5c. per unit and fines, 9c. Spanish pyrite contains from 46@52% sulphur and domestic 42@44 per cent.

Nitrate of Soda.—This market maintains its strength. Spot goods are quoted at $2.17½ per 100 lb. for 96%; futures, $2.21½@$2.25, according to position. For 95% quotations are $2.15 for spot, $2.20@$2.22½ for futures.

Above quotations are for 96%, 95% can be had at from 2½c. to 5c. cheaper. Deliveries this year show an increase of 13,438 tons.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, August 1, gives the following interesting statistics, in long tons:

	1903	1904
Imports, Atlantic Ports, Jan. 1 to date.	136,264	126,126
	126,126	136,264
Stock in store and afloat Aug. 1, 1904, in N. Y.	2,000	400
Baltimore	1,400	.....
To arrive, due Nov. 15, 1904	78,500	91,200
Visible supply to Nov. 15, 1904	81,900	91,600
Stock on hand Jan. 1, 1904.	7,800	8,100
Deliveries past month	21,629	12,950
Deliveries since Jan. 1 to date	130,526	143,964
Total yearly deliveries.	229,589	.....
Prices current, Aug. 1, 1904	2.05c.	2.17½c.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write under date of June 25 that prices have advanced as high as 7s. 6d. alongside, being paid for 95%, July 1 delivery, and 7s. 5d. for August. Some monthly deliveries from April to December, 1905, of 95% have changed hands at 6s. 9½d.@6s. 10d. The refined class is not so well inquired for, although some parcels have been sold at 7s. 7d. for prompt, 7s. 6d. for August to September, owing to the small difference in price now current between the two qualities; two strings of monthly parcels April to December, 1905, are also reported sold at 7s. 0½d.@7s. 1d., steamer terms, April to June, 7s. 1d. and April alone 7s. 2d. The market closes quieter, with some few buyers of 95% at 7s. 5d. for July to September; 7s. 4½d. October to November; 7s. 4d., December; 7s. 2½d. January to February; 7s. 1½d. March; and 96% sellers July to December, 7s. 6d., all alongside terms. The price of 7s. 5d. with an all round freight of 17s. 6d. stands in 9s. 2¾d. per cwt. net cost and freight, without purchasing commission.

Sulphate of Ammonia.—Dull and easy at $2.95 per 100 lb. for spot gas-liquor, and $3@$3.05 for shipment.

Phosphates.—Little new business is reported. Miners, however, are generally busy on season contracts.

Exports of Florida high-grade work from Savannah in July were 5,160 tons, making 74,338 tons for the seven months this year. Compared with 1903 there is shown a decrease of 8,085 tons in 1904.

Ocean freights are as follows, per ton:

Ports.	Florida.	So.Car.	Bone, Algeria.	Sfax, Tunis.
Baltic	$3.36@3.62	.....	.....	$2.16
Continental	3.12	.....	$1.44	1.80@1.86
Mediterranean	3.36	$2.88	2.04	2.28
U'k'd[illegible]King'm	3.00	2.64@2.76	....	1.80

Exports of phosphates from Tunis in June were 48,316 metric tons, making 229,050 tons for the half-year, chiefly to Great Britain, Italy and France.

Charters are few, while shipowners are inclined to steady their rates.

Phosphates are quoted as follows, per ton:

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla., hard rock, 77@80%	$7.25@$7.50	$10.53@11.70
land pebble, 68@73%.	3.75@ 4.00	7.70@ 8.40
†Tenn., 78@80%	4.00@ 4.25	10.27@10.67
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
‡So. Car. land rock	3.25@ 3.50	.....
river rock, 55@60%	3.00@ 3.25	6.33@ 6.56
Algerian, 63@70%	....	6.93@ 7.59
58@63%	....	6.15@ 6.60
53@58%	....	5.05@ 5.20
Tunis (Gafsa)	....	6.33@ 6.50
Christmas Isle, 80@85%	....	12.87@14.11
Ocean Isle, 82@88%	....	13.60@14.45
Somme, Fr., 70@75%	....	10.63@11.02
Bordeaux, Fr., 60@65%	....	7.60@ 7.72
55@60%	....	6.44@ 6.55
Liege, Bel., 60@65%	....	7.00@ 7.10

*F. o. b. Florida or Georgia ports. †F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

METAL MARKET.

New York, Aug. 10.

Gold and Silver Exports and Imports,

At all United States Qorts in June and Qear.

Metal	June		1903.		1904.
Gold					
Exports			$12,507,588		$1,577,544
Imports			2,767,553		4,880,979
Excess	E.		$9,740,035	I.	$3,303,435
Silver:					
Exports			1,556,410		4,430,634
Imports			2,050,805		2,717,609
Excess	I.		$494,395	E.	$1,713,025

Metal	Year.	1903.		1904.
Gold				
Exports		$31,336,241		$68,504,393
Imports		13,976,054		47,758,472
Excess	E.	$17,360,197	E.	$20,745,921
Silver:				
Exports		17,505,359		26,387,699
Imports		9,981,294		13,740,800
Excess	E.	$7,524,065	E.	$12,646,891

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending August 6th and for years from January 1st,

Period.	Gold.		Silver.	
	Exports.	Imports	Exports.	Imports.
Week	$3,000	$29,835	$725,485	$26,256
1904	63,733,202	3,652,656	24,308,879	591,744
1903	2,161,549	3,613,399	12,240,652	1,254,294
1900	24,004,088	1,442,169	15,022,990	775,001

Exports of gold were to Mexico; of silver chiefly to London. Imports were from the West Indies and South America.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd	$171,841,900	.....	$273,168,200	.....
England	175,123,430	.....	170 552,465	.....
France	511,493,610	$225,247,880	540,456,480	$225,182,070
Germany	171,395,000	60,220,000	171,315,000	60,195,000
Spain	73,000,000	102,300 000	73,805,000	102,295,000
Netherlands	19,700,500	32,433,500	27,389,000	32,437,000
Belgium	14,540,000	7,270,000	15,183,335	7,591,665
Italy	94,940,000	11,576,000	90,650,000	15,882,500
Russia	406,720,000	44,890,000	468,010,000	43,170,000
Austria	226,640,000	64,975,000	240,875,000	63,320,000

The returns of the Associated Banks of New York are of date of Aug. 6 and the others Aug. 4, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending August 6, gives the following totals, comparisons being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$912,697,100	$1,095,476,900
Deposits	912,272,500	1,204,213,400
Circulation	43,916,900	38,641,500
Specie	171,841,900	273,168,200
Legal tenders	77,813,300	84,194,000
Total reserve	$249,655,200	$357,362,200
Legal requirements	228,068,125	301,053,350
Balance surplus	$21,587,075	$56,308,850

Changes for the week this year were increases of $3,522,400 in deposits, $5,227,500 in specie, $1,003,100 in legal tenders, and $5,380,000 in surplus reserve; decreases of $2,511,100 in loans and discounts, and $169,700 in circulation.

The United States Assay Office in New York reports receipts of 72,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to July 28 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.		Changes.
India	£3,578,525	£6,019,638	I.	£2,441,113
China	247,499	372,722	I.	125,223
Straits	548,679	58,103	D.	490,576
Total	£4,374,703	£6,450,463	I.	£2,075 760

Receipts for the week were £198,000 from New York, £10,000 from the West Indies and £4,000 from Australia; a total of £212,000. Shipments were £537,500 to India and £4,233 to China; £541,733 in all.

Indian exchange has been firmer, and all the Council bills offered in London were taken, at an average of 16.03d. per rupee. The demand for silver in India continues very good.

The movement of gold and silver in France for the five months ending May 31 was as follows:

Gold	1903.	1904.		Changes.
Imports	fr.103,826,000	fr.382,173,000	fr.	ŒŒŒŒŒŒ
Imports—	Fr.103,826,000	Fr.382,173,000	I.	Fr.278,347,000
Exports—	32,921,000	35,510,000	I.	2,589,000
Excess, imports—	70,905.000	346,663,000	I.	275,758,000
Silver				
Imports—	41,647,000	47,534,000	I.	5,887,000
Exports—	31,164,000	59.697,000	I.	28,533,000
Excess—	I.10,483,000	E.12,163.000		

Imports of copper and nickel coins were 36,000 fr. this year and 41,000 fr. in 1903. Exports were 145,000 fr. against 293,000 for last year.

Exports of gold from Australia for the six months ending June 30 are reported as follows:

	1903.	1904.		Changes.
Melbourne	£2,535,337	£2,028,397	D.	£506,940
Sydney	1,482,960	1,847,911	I.	364,951
Adelaide	50,000	5,000	D.	45,000
Fremantle	3,943,867	3,678,630	D.	265,237
Totals	£8,012,164	£7,559,938	D.	£452,226

Of the exports this year £4,961,706 went to India, £150,303 to China and £400,000 to Germany; nearly all of the rest going to Great Britain.

PRICES OF FOREIGN COINS.

	Bid.	Ask
Mexican dollars	$0.46	$0.47½
Peruvian soles and Chinese pesos	.42	.44
Victoria sovereigns	4.86	4.87
Twenty francs	3.88	3.92
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

August.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb.	Copper. London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
4	12⅜ @12⅜	12¼ @12⅜	12 @12¼	56½	27½	4.10	4.85	4.70
5	12⅜ " 12⅜	12¼ " 12⅜	12 " 12¼	56¾	27	4.10	4.85	4.70
6	12⅜ " 12⅜	12¼ " 12⅜	12 " 12⅛	....	27	4.10	4.85	4.70
8	12⅜ " 12½	12¼ " 12⅜	12 " 12¼	56⅝	26⅞	4.10	4.85	4.70
9	12⅜ " 12½	12¼ " 12⅜	12 " 12¼	56⅝	26⅞ @ 26⅞	4.10	4.85	4.70
10	12⅜ " 12½	12¼ " 12⅜	12 " 12¼	56½ @ 56⅝	26⅞	4.10	4.85	4.70

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

August	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	August	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
4	4.87⅛	58½	26⅛	8	4.88	58½	26⅛
5	4.87⅛	58½	26⅛	9	4.88	58½	26⅛
6	4.88	58½	26⅛	10	4.8830	58½	25⅞

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver .925 fine.

Copper has ruled very quiet indeed, and nothing of interest has transpired. Exports continue on a large scale. It is reported that the Calumet & Hecla Co., which made rather large sales abroad, is sold out for some time to come. Quotations are more or less nominal at 12⅜@12½ for Lake; 12¼@12⅜ for electrolytic in ingots, cakes and wirebars, 12@12⅛ in cathodes; 12@12⅛ for casting copper.

The market for standard copper in London, which closed last week at £56 15 s., opened on Monday at £56 12s. 6d., and the closing quotations on Wednesday are cabled as £56 10s.@£56 11s. 3d. for spot, £56 11s. 3d.@£56 12s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £59 10s.@£60; best selected, £60 10s.@£61; strong sheets, £69@£70; India sheets, £67@£68; yellow metal, 6@6⅛d.

Tin.—In the absence of any speculative demand the market has had a declining tendency, and lower prices have been accepted. The quotations at the close are 26⅝@26¾ for spot and futures.

The foreign market, which closed last week at £122 5s., opened on Monday at the same price, declined on Tuesday to £121 10s., and the closing quotations on Wednesday are cabled as £121 10s.@£121 12s. 6d. for spot, £122@£122 2s. 6d. for three months.

Lead is quiet and unchanged. The closing quotations are 4.10 New York, 4@4.02½ St. Louis.

The foreign market is firm, Spanish lead being quoted at £11 15s. English lead at £11 17s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull and uninteresting. Missouri brands are selling at 4c., and desilverized 4.02½c. East St. Louis.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of July 30, that the price of silver during the week has been 14.75 reales per oz. Exchange is 34.75 pesetas to £1. Local quotation for pig lead has been 65.50 reales per quintal, which, on current exchange, is equal to £10 11s. per long ton, f. o. b. Cartagena. Exports were 600,000 kg. desilverized to London, 127,900 kg. desilverized and 226,090 kg. pig lead to Marseilles. There were also 58 tons lead ore shipped to Swansea.

Spelter has ruled quiet, but steady, throughout the week and nothing of interest has transpired. The ore market remains very firm. The closing quotations are given as 4.70 St. Louis, 4.85 New York.

The foreign market is firm, good ordinaries being quoted at £22, 2s, 6d, specials at £22, 7s, 6d.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is dull but steady. The latest sales are on a basis of 4.72½@4.75c. East St. Louis, according to brand and delivery.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of July 30, that there is no change in the strong position of zinc ores. Prices continue 67 fr. per ton for blende, 35% zinc, and 47 fr. for calamine, 30% zinc. Exports were 500 tons blende to Swansea and 200 tons blende to Antwerp.

Antimony is dull and neglected. We quote: Cookson's at 7@7⅜; Hallett's, 6⅝@6¾; U. S., Italian, French, Japanese, Hungarian and Chinese, 6@6⅛ cents.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Platinum.—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Quicksilver.—Prices are unchanged. In New York large lots have been offered at $43.50 per flask, with $44.50 quoted for smaller orders. The San Francisco price continues $43@$44 for domestic business, but as low as $41.50@$42 has been offered for export. The London price is £7 17s. 6d., with the same quotation from second hands.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg. at Breslau, Germany. Manganese metal is quoted 360 marks per 100 kg., f. o. b. Bremen, Germany. Manganese tin alloy, 55%, is quoted 365 marks per 100 kg. for first quality and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals and their alloys, wholesale prices, f. o. b. works, are as follows:

	Per lb.		Per lb.
l Aluminum			
*l*No. 1 99% ingots	.33@37c.	Ferro-chrom. (74%)	12½c
*l*No. 2 90% ingots	.31@34c.	Ferro-Tungsten (37%)	.45c.
*l*Rolled Sheets	4c. up	Magn'um, pure (N. Y.)	.60c.
*l*Alum-bronze	20@23c.	Manganese	$2.75
*l*Nickel-alum	33@39c.	Mangan'e Cp. (20%Mn)	.32c.
*l*Bismuth	$2.10	M'ng'n'e Cp. (30% Mn)	.38c.
*l*Chr'm'm, pure (N. Y.)	.80c.	Molybdenum (Best)	$1.70
*l*Copper, red oxide	.50c.	Phosphorus, foreign	.45c.
*l*Fe.-Molybd'm (50%)	$1.00	Phosphorus, American	.70c.
*l*Ferro-Titanium (10%)	90c.	Sodium metal	50c
*l*Ferro-Titanium (20@25%)	Tungsten (Best)		$1.25
l N. Y.	.55c.		

Differences in price depend chiefly upon size and conditions of order.

Missouri Ore Market. Aug. 6.

(From Our Special Correspondent.)

The highest price reported paid for zinc ore on straight bid was $40 per ton, but some ore sold on the assay basis was settled for at $41 per ton. The assay price is strong at $36@$38 per ton of 60% zinc, with a large part of the week's sales made on the $37 basis.

Following are the shipments of zinc and lead from the various camps of the Joplin district for the week:

Webb City-Carterville	2,595,210	668,020	$62,780
Joplin	2,428,180	306,770	54,115
Duenweg	931,720	233,080	22,830
Galena-Empire	842,440	93,110	15,910
Alba-Neck	779,290	19,920	15,310
Prosperity	370,480	105,910	9,240
Aurora	624,380	14,100	8,920
Granby	403,550	22,000	5,040
Sherwood	231,050	18,480	5,100
Carthage	189,150	.....	3,410
Zincite	60,400	13,140	1,440
Diamond	68,330	.....	1,230
Beef Branch	61,350	26,850	1,150
Oronogo	62,980	.....	1,140
Spurgeon-Spring City	33,940	7,320	485
Totals	9,682,450	1,528,700	$208,100
Last week	9,358,670	1,096,540	187,130
32 weeks this year	316,905,680	39,892,160	6,334,695
32 weeks last year	301,833,490	35,876,530	6,137,670

Zinc value, this week $168,580; 32 weeks, 5,237,665
Lead value, this week, 39,520; 32 weeks, 1,096,950

The work of unwatering the mines flooded during the July rains is proving a harder proposition than was at first believed. At Carl Junction the pumps have been pulled and the drainage problem abandoned, and at Galena, where a creek broke through into the mines, no effort has yet been made to reclaim the mines on three tracts of land thus affected. It is now thought to be impossible to drain this land again until the creek is turned, which would mean about a year's work. The Midway tract of the American Zinc, Lead & Smelting Co. is still under water, the deep mines at Granby are yet undrained, and miners are still shut out of numerous small mines here and there over the district. Not only the drainage question is involved, but also one of the safety of the ground. The water-soaked ground has been sliding at some mines, and instead of outputting the time is spent in re-cribbing and re-timbering to protect the shafts and drifts. It will be weeks and perhaps months before the output again approaches 5,000 tons per week, it being about 400 to 600 tons short of that amount now. It was as high as 5,300 tons during the early spring.

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan.	28.33	28.845	4.075	4.347	4.865	4.863
Feb.	29.43	28.087	4.075	4.375	5.043	4.916
Mar.	30.15	28.317	4.442	4.475	5.349	5.057
April.	29.81	28.132	4.567	4.475	5.550	5.219
May.	29.51	27.718	4.325	4.423	5.639	5.031
June.	28.34	26.32	4.210	4.16	5.697	4.760
July.	27.68	26.573	4.075	4.192	5.662	4.873
Aug.	28.29	.....	4.075	.....	5.725	.....
Sept.	26.77	.....	4.243	.....	5.686	.....
Oct.	25.92	.....	4.375	.....	5.510	.....
Nov.	25.42	.....	4.218	.....	5.038	.....
Dec.	27.41	.....	4.162	.....	4.731	.....
Year	28.09	.....	4.237	.....	5.400	.....

Note.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5.038c.; May, 4.853c.; June, 4.596c.; July, 4.723c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan.	12.159	12.410	12.361	12.553	53.52	57.55
Feb.	12.778	12.063	12.901	12.245	57.34	56.57
Mar.	14.416	12.299	14.572	12.551	63.85	57.321
April.	14.454	12.923	14.642	13.120	61.72	58.247
May.	14.435	12.758	14.618	13.000	61.73	57.321
June.	13.942	12.269	14.212	12.399	57.30	56.398
July.	13.094	12.380	13.341	12.505	56.64	57.256
Aug.	12.962	.....	13.159	.....	58.44	.....
Sept.	13.205	.....	13.345	.....	56.82	.....
Oct.	12.801	.....	12.954	.....	55.60	.....
Nov.	12.617	.....	12.813	.....	56.30	.....
Dec.	11.952	.....	12.084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London, Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents	London, Pence.	N. Y., Cents.
Jan.	25.62	55.56	21.98	47.57	26.423	57.055
Feb.	25.41	55.09	22.11	47.89	26.665	57.592
Mar.	25.00	54.23	22.49	48.72	26.164	56.741
April.	24.34	52.72	23.38	50.56	24.974	54.202
May.	23.71	51.31	24.89	54.11	25.578	55.430
June.	24.17	52.36	24.29	52.86	25.644	55.673
July.	24.38	52.88	24.86	53.92	26.760	58.095
Aug.	24.23	52.52	25.63	55.36	.....	.....
Sept.	23.88	51.52	26.75	58.00	.....	.....
Oct.	23.40	50.57	27.89	60.36	.....	.....
Nov.	22.70	49.07	27.01	58.11	.....	.....
Dec.	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company.	Latest Dividend—Payable.	Rate.	Total.	Total to date.
†Amalgam'td Copper	Aug. 29	.50	$769,430	$25,042,697
Bunker Hill & Sull.	Aug. 4	.25	75,000	1,971,000
Cambria Steel	Aug. 15	.75	675,000	7,800,000
Daly-West	Aug. 15	.40	72,000	4,237,000
Esperanza, Mex	Aug. 12	.12	54,600	1,322,549
*Jeff. & C., C.&I., pf.	Aug. 15	2.50	37,500	675,500
Jeff. & Clearf., com.	Aug. 15	5.00	75,000	255,000
†National Carbon, pf	Aug. 15	1.75	78,750	1,811,250
Quincy, Mich	Aug. 25	2.50	250,000	14,620,000
†U. S. Steel Cor., pf.	Aug. 30	1.75	6,304,919	111,792,816

*Monthly. †Quarterly.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Albion, Utah	Aug. 6	Aug. 23	$0.05
Allouez, Mich	Sept. 26	.....	1.50
Best & Belcher, Nev	Aug. 19	Sept. 8	.10
Caledonia, Nev	Aug. 31	Sept. 21	.15
Con. Imperial, Nev	Aug. 10	Sept. 6	.01
Gould & Curry, Nev	Aug. 12	Aug. 30	.10
Johnny, Utah	Aug. 9	.....	.05
Julia Con., Nev.	Aug. 11	Sept. 1	.03
New York, Bonanza, Utah	Aug. 2	Aug. 25	.02
Middle Yuba, Cal.	Aug. 23	.....	.01
Overman, Nev	Aug. 23	Sep. 12	.10
Seg. Belcher & Mides, Nev.	Aug. 30	Sept. 19	.05
Silver Shield, Utah	Aug. 24	Sept. 12	.03
St. George Copper, Utah	Aug. 15	Aug. 30	.01
Red Cross, Utah	Aug. 11	Aug. 26	.09
Union Con., Nev.	Aug. 23	Sept. 12	.10

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 8 H.	Aug. 8 L.	Aug. 9 H.	Aug. 9 L.	Sales.
Amalgamated	$100	52⅜	51¾	52½	51¼	52	51¾	52	51¾	52½	51¾	52⅝	51⅛	35,480
Anaconda	25	72	...	72	...	...	...	...	...	...	...	...	...	200
Best & Belcher	3	...	...	...	...	...	...	60	...	...	...	...	...	200
Brunswick	1	...	...	...	...	...	...	...	...	...	...	15	...	700
Bullion	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Caledonia	1	...	...	...	...	...	...	...	...	...	...	40	...	100
Chollar	2½	...	...	12	11	...	...	...	...	...	...	...	...	500
Chripolite	50	...	...	...	...	...	...	...	...	...	...	...	...	...
C. K. & N	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Confidence	3	65	...	...	...	...	...	...	...	...	...	...	...	100
Con.Cal.& Va.	2½	125	...	115	...	120	...	120	...	...	...	...	...	800
Con. Imperial	1	...	...	...	...	2	...	...	...	...	...	...	...	500
Cripple CreekCon	1	9	8	...	...	8	...	...	...	...	...	...	...	2,000
Crown Point	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Elkton	1	66	...	...	...	...	...	...	...	...	...	...	...	100
Gold Dollar	1	...	...	...	...	...	...	...	...	...	...	5	...	1,000
Greene Con.	10	...	...	...	...	...	...	...	...	15	14½	14½	...	800
Hale & Norcross	3	...	...	...	...	...	...	64	...	...	...	...	...	100
Homestake	100	54½	54	...	...	...	...	...	...	...	...	...	...	330
Isabella	1	...	...	...	...	21	...	...	...	22	...	...	...	1,000
Justice	2	...	...	...	...	...	...	...	...	11	10	...	...	500
Little Chief	50	...	...	...	...	5	...	...	...	...	...	...	...	200
Mexican	3	82	...	80	...	80	...	...	...	79	...	80	...	800
Mollie Gibson	5	...	...	...	...	...	...	...	...	...	...	...	...	...
Moon Anchor	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Moulton	25	...	...	...	...	...	...	...	...	...	...	...	...	...
Occidental	3	80	...	...	...	...	...	...	...	...	...	...	...	100
Ophir	5	...	...	...	...	...	...	240	...	230	...	...	...	200
Overman	2	...	...	...	...	...	...	12	...	...	...	...	...	100
Pharmacist	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Phoenix	1	8	...	...	...	...	...	...	...	...	...	...	...	500
Portland	1	210	170	...	...	...	...	165	...	...	...	...	...	300
Potosi	1	14	...	14	...	...	...	...	...	...	...	...	...	400
Rose Maud	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Savage	3	...	...	23	...	25	...	...	...	...	...	...	...	400
Sierra Nevada	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Silver Hill	1	...	...	...	...	...	...	...	...	56	...	...	...	100
Standard Con.	10	...	...	200	...	205	...	...	...	...	...	200	...	300
Tennessee	25	...	...	...	...	...	...	...	...	...	...	27½	...	100
Union Con	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Union Copper	10	...	...	...	...	...	...	...	...	...	...	...	...	...
United Cp. Com	100	...	...	...	...	...	...	...	...	...	...	...	...	...
Vindicator	1	...	...	...	...	...	...	62	...	...	...	...	...	500
White Knob	10	4	...	4	...	3½	3	4	...	...	...	4	3½	1,925
Work	1	9	...	9	...	...	...	...	...	9	...	9	...	10,000
Yellow Jacket	3	...	...	...	...	...	...	...	...	...	...	...	...	...

Total sales, 60,335 shares.

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 8 H.	Aug. 8 L.	Aug. 9 H.	Aug. 9 L.	Sales.
Allis-Coalmers	$100	...	...	...	...	...	...	11	...	...	...	...	...	1,110
Preferred	100	...	...	...	...	...	...	...	...	...	...	...	...	...
Am. Agr. Chem.	100	...	...	...	...	...	...	...	...	...	...	...	...	...
Preferred	100	...	...	...	...	...	...	...	...	...	...	...	...	...
†Am. Sm. & Ref.	100	57⅛	57	57⅞	57⅛	57⅞	57⅛	57⅛	57⅛	57⅞	57⅛	58¼	57	7,665
Preferred	100	99½	99	99½	...	99⅝	...	99⅛	99⅛	99⅝	...	100	99⅞	1,975
Col. Fuel & I	100	36½	...	36⅝	36	36½	...	36½	34⅝	36	...	36¼	35⅝	1,270
Col. & H. C. & I.	100	...	...	9	...	9⅛	9	9⅛	...	9⅛	9⅛	9⅛	9	1,100
Crucible Steel	100	5⅛	5⅛	5⅛	...	5⅛	...	5⅛	...	5⅛	...	5⅛	5⅛	825
Preferred	100	...	...	38½	38	38½	...	38½	38	38	37½	38	37½	1,255
General Chemical	100	...	...	...	...	...	...	50½	...	...	...	...	...	100
Preferred	100	...	...	...	...	94½	...	...	...	...	...	...	...	100
Mong. R. Coal	50	...	...	8	...	...	...	...	...	8	...	...	...	300
Preferred	50	19½	...	...	...	...	...	...	...	...	...	...	...	25
National Lead	100	20⅛	19⅞	20½	20½	...	...	21	...	21¼	21	21½	...	4,310
Preferred	100	...	...	...	...	...	...	...	...	...	...	...	...	...
Phila. Nat. Gas	100	38½	...	38½	38½	...	...	...	...	...	...	...	...	85
Preferred	100	...	...	...	...	...	...	...	...	45½	...	...	...	45
Pittsburg Coal	100	...	...	...	...	...	...	...	...	...	...	13¾	13	728
Preferred	100	55½	55	55	54½	55	54½	55	...	54½	54½	55	54½	718
Republic I. & S.	100	7⅞	7½	7½	...	7½	7⅛	...	...	7⅛	...	7⅛	7⅛	2,470
Preferred	100	45	44½	44½	43½	...	...	...	...	43½	42½	43	42½	2,740
Schloss-Shef.S&I	100	...	...	38½	37½	...	...	...	...	37½	...	37½	37½	700
Preferred	100	...	...	...	...	...	...	...	...	...	...	...	...	...
†Standard Oil	100	632	630	631½	...	631	630	630	...	631	...	631	...	74
Tenn.C.I.&R.R.	100	46½	45½	45½	44½	44½	44½	44½	44½	44	43	44½	43½	16,900
U.S.Steel Corp	100	12⅜	12⅛	12⅜	12	12	11⅞	12⅛	12	12⅛	11⅞	12	11⅛	28,562
Preferred	100	61⅛	6 7/8	61⅞	60⅜	60⅜	58⅝	59⅝	59⅛	59⅛	58	59	57⅞	145,001
Va.-Car Chem	100	27½	27	27	...	28⅛	26⅞	29⅛	28½	29⅝	29	29⅜	28⅝	9,035
Preferred	100	102¾	102½	102¾	102½	103½	102⅝	103⅜	103½	104½	103½	104½	103½	8,237

*Pittsburg Exchanges; all others, New York Stock Exchange †Ex Dividend,
Total Sales, 235,330 shares.

SAN FRANCISCO.*

Company.	Location	July 28 H.	July 28 L.	July 29 H.	July 29 L.	July 30 H.	July 30 L.	Aug. 1 H.	Aug. 1 L.	Aug. 2 H.	Aug. 2 L.	Aug. 3 H.	Aug. 3 L.	Sales.
Golden Anchor	Nev.	...	...	...	...	...	...	...	...	...	...	...	...	...
MacNamara	Nev	50	46	50	46	51	47	50	45	50	46	46	44	29,000
Mont. Tonopah	Nev.	240	...	240	...	242½	...	242½	240	242½	240	245	...	3,250
Ton. Belmont	Nev.	75	74	73	...	72	...	72	71	70	...	75	70	4,400
Ton. Midway	Cal.	54	...	54	...	56	55	55	...	54	...	54	53	3,500
Ton. Mg. Co.	Nev.	800	...	800	...	...	...	875	812½	...	...	875	...	600
Ton. North Star	Nev.	...	...	...	...	...	...	36	33	33	...	...	...	5,400

* San Francisco & Tonopah Exchange. Total Sales, 46,150 shares.

SAN FRANCISCO (By Telegraph.)

Company	August 8	August 9	Company	August 8	August 9
Belcher	$0.12	$0.12	Gould & Curry	$0.08	$0.18
Best & Belcher	.64	.66	Hale & Norcross	.65	.67
Caledonia	.18	.37	Mexican	.81	.79
Challenge Con.	.18	.17	Ophir	2.35	2.30
Chollar	.12	.12	Overman	.09	.08
Confidence	.60	.60	Sierra Nevada	.20	.20
Con. California & Virginia	1.15	1.10	Union Con.	.23	.21
Crown Point	.10	.10	Yellow Jacket	.16	.16

BOSTON MASS.

Company.	Par val.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 8 H	Aug. 8 L.	Aug. 9 H.	Aug. 9 L.	Sales.
Adventure Con.	$25	75	...	87½	75	1	...	1	...	...	...	...	...	2,025
Allouez	25	8⅜	8½	8⅜	...	8⅜	8⅞	8⅞	8⅜	8⅜	8½	8⅜	...	2,605
†Amalgamated	100	52⅜	51¾	52	51⅞	51½	51⅜	52	51¾	52½	51¾	52½	51⅜	31,321
American Zinc	25	11¾	...	11¼	...	11⅜	11½	11⅞	...	...	...	...	...	2,250
Anaconda	25	...	...	...	...	...	...	...	...	...	...	...	...	25
Arcadian	25	...	...	...	...	...	...	...	...	...	...	...	...	665
Arnold	25	...	...	...	...	...	...	...	...	...	...	...	...	...
Atlantic	25	...	...	8⅜	8	8⅜	8	...	...	9	8½	9⅜	9	1,150
Bingham Con.	50	25	24½	25½	25	25½	25	25½	...	25½	...	24½	24½	8,095
Bonanza	10	...	...	43	...	...	...	50	...	41	...	...	...	1,015
Boston Con.	5	6½	...	6¾	...	7	6½	6¾	6¾	6⅞	6½	...	...	64
Calumet & Hecla	25	480	...	480	...	480	479	...	...	...	...	480	...	100
Centennial	25	24½	...	24	...	24¼	23⅞	24	...	...	...	23¾	...	8,110
Central Oil	...	...	...	...	...	...	...	...	...	...	...	...	...	9,607
Con. Mercur	5	...	...	35	...	35	...	...	...	37	...	...	...	1,233
Cont. Zinc Mg.	25	...	...	...	...	...	...	8	...	10	...	...	...	...
Copper Range	100	55	53⅜	54½	52½	53	52	54½	52⅜	55½	54½	55½	55	47,484
Daly-West	20	14	13	14	13⅜	14¼	14	14⅜	14¼	15	14⅜	14⅜	13½	6,903
Dominion Coal	100	...	...	...	...	45½	...	...	...	...	...	48	47	440
Preferred	...	...	...	105¾	...	...	...	105½	...	104	...	105	...	128
Dominion I.& S	100	8⅜	8¼	9	...	9	8½	9	...	8⅜	8½	8⅜	...	320
Elm River	12	7½	...	2⅜	...	2⅜	...	2¼	...	2⅜	2⅜	2¼	...	875
Franklin	25	7	...	8	7½	8	7½	...	...	7¼	...	7¼	...	606
Granby Con.	10	1½	3	3	3	2⅞	...	3	...	3	...	3	3	5,680
Guanajuato Con.	5	1½	...	...	...	1¼	1⅛	1¼	...	1⅛	1⅛	1⅛	1⅛	1,830
Isle Royal Con	25	10⅜	...	10½	...	10⅜	...	10¼	10⅛	10⅛	10½	12⅛	10½	6,129
Mass Con	25	4	3½	3¾	3½	4½	...	3¼	...	3⅜	3⅜	3½	...	500
Mayflower	25	...	...	...	...	45	...	50	...	...	...	...	...	400
Michigan	25	4	...	4½	4½	4½	4⅛	4	...	4⅜	4½	4½	...	710
Mohawk	25	43½	43	43	42½	42½	...	43	...	44½	43½	42½	...	2,512
Mont. Coal & C.	25	...	...	...	...	...	...	...	...	...	...	...	...	300
New Idria,q'sil.	5	8½	...	9½	...	...	...	...	...	...	...	...	...	10
Old Colony	25	...	...	...	...	100	75	100	...	...	...	87½	...	1,670
Old Dominion	25	14½	13⅜	14	...	13½	...	13½	...	14	...	12⅜	13½	2,620
Osceola	25	64½	64	63⅜	63½	63⅜	63	63½	...	63½	62⅜	63⅜	63	921
Parrot	10	25	27⅞	24	...	23½	...	23	...	23	25	25½	...	2,566
Phœnix Con.	25	1	...	1	75	75	...	75	...	75	...	75	50	450
Quincy	25	84	...	84	...	89	...	...	...	82½	...	81	80½	321
Rhode Island	25	77	...	...	...	1⅛	1	1⅛	...	1	...	80	...	330
Santa Fe	10	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛	2⅛	2	2⅛	1⅞	2	1⅞	28,160
Shannon	10	5⅜	5¼	5⅞	5¼	5⅜	4⅞	5	4⅞	4⅜	4⅛	4⅞	4⅜	5,860
Tamarack	25	89½	89	89	88	89	...	...	...	88½	90	90½	90	197
Trinity	25	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	8	7⅞	7⅞	7⅞	15,926
United States	10	22	21⅜	21⅞	21⅞	22	21⅜	22⅜	21⅛	22⅜	22	22⅛	22	18,556
U.S.Coal & Oil	25	11⅛	10⅜	10⅞	10⅜	11⅞	11⅛	11⅜	11⅜	10⅜	11⅛	10⅜	10⅜	2,440
Utah Con.,g.c.	5	38	37⅜	37⅛	...	39	37⅝	39⅛	38⅜	39½	38⅜	38⅜	38⅜	23,142
Victoria	25	2⅞	2⅜	3⅜	3	3⅛	3⅛	2⅜	...	2⅜	3⅛	3⅛	3⅛	3,065
Winona	25	8⅛	7⅞	8⅛	8	7⅞	7⅛	8⅛	8⅛	8⅛	8	8⅛	8	4,333
Wolverine	25	78¼	78	78	...	78	77⅜	79	78	79	...	80	79	491
Wyandot	25	...	...	70	...	75	70	87½	...	60	...	65	...	1,150

Total sales, 147,470 shares.

COLORADO SPRINGS, COLO.

Company.	Par val.	July 30 H.	July 30 L.	Aug. 1 H.	Aug. 1 L.	Aug. 2 H.	Aug. 2 L.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Aug. 5 H	Aug. 5 L.	Sales.
Acacia	$1	6½	6	6½	6	6½	6	6½	6	6⅜	6	7	6	2,000
Anaconda	5	12	...	12	...	13	...	11	...	12½	10¼	11	...	500
Colo. City & M.	1	1½	...	2	1½	2	...	2	1½	2	1¼	1½	...	...
C. K. & N.	1	34	31	35	32	34½	30	35	32¼	35	32	35	32¼	...
Cripple Ck. Con	1	9½	8⅜	9½	9¼	9½	9	9½	9	8⅞	8⅜	8⅞	8⅜	14,000
Des Moines	1	2	1½	2	1	2	1½	2	1½	2	1½	2	1½	...
Doctor-Jack Pot	1	4½	4¼	4½	4¼	4⅜	4	4¼	4	4¼	4	4⅜	4¼	2,000
Elkton Con.	1	65	64	65	64	65	64	65	...	64½	64	64¼	64	4,117
El Paso	1	91	89½	90½	90	90	89½	90	89½	91	89¾	91	90	12,000
Gold Dollar Con.	1	4⅜	4½	4⅜	4⅜	4⅜	4½	4⅝	4¼	4⅞	4⅜	5⅛	5	9,000
Gold Sovereign	1	6½	6⅜	6⅜	6⅜	6⅜	6	6½	6⅜	6½	6⅜	6½	6	...
Golden Cycle	1	45	40	45	40	45	40	45	40	45	40	45	40	...
Hart	1	4	2	4	2	4	2	4	2	4	2	4	2	...
Isabella	1	20	19	20½	19⅛	20½	19⅛	21½	20	22	20	21½	20⅛	5,000
Jack Pot	1	5	...	4⅜	3	5	3	5	...	5	...	5	...	500
Keystone	1	4⅛	4⅛	4⅜	4⅛	4⅜	4⅛	4⅜	4⅛	4⅛	4⅛	4⅛	4⅛	2,000
Last Dollar	1	40	...	40	...	40	...	40	...	40	...	40	...	...
Lexington	1	3⅞	3⅜	3⅞	3⅜	4	3⅜	4	3⅜	4	3⅜	3⅞	3⅜	2,000
Little Puck	1	3⅞	3⅜	4	3⅞	4	3⅞	3⅞	3⅜	3⅞	3⅜	3⅞	3⅜	4,000
Mollie Gibson	1	4⅜	4⅛	4⅛	5	4	4⅜	4	4⅛	4⅛	4⅛	4⅛	...	...
Moon-Anchor	5	7	5½	6½	6	6½	6	6½	5½	6½	5½	7	5⅜	2,000
New Haven	5	3⅛	2⅜	3	2¼	3	...	3	2½	3	2½	2	3	...
Old Gold	1	9⅛	8⅞	9⅛	8⅜	9	...	9⅛	9	9⅜	9⅛	9⅛	8⅜	9,000
Pharmacist	1	3⅜	3⅛	3⅜	3⅛	3⅜	3⅛	4	3⅜	3⅜	3⅛	4	3⅛	1,000
Portland	1	167	157½	170	157½	172½	159	167	162	172½	159	170	159	600
Vindicator Con.	1	65	...	75	66	66	...	66	...	70	66	70	66	500
Work	1	9	8⅞	9⅞	9⅜	10	9⅜	9⅜	9⅜	9⅜	9⅜	9⅜	9⅜	45,000

Total sales, 115,217 shares.

COLORADO SPRINGS (By Telegraph).

Company.	Aug. 8. H.	Aug. 8. L.	Aug 9. H.	Aug 9. L.	Company.	Aug. 8. H.	Aug. 8. L.	Aug. 9. H.	Aug. 9. L
Anaconda	12	11¼	...	...	Jack Pot	5	...	...	...
Cripple Ck. Con	8⅜	8⅛	...	...	Last Dollar	40	...	...	...
C. K. & N	36	34	36	32⅜	Mollie Gibson	4⅜	4	4⅜	4⅛
Doctor Jack Pot	4⅛	4	...	...	Moon Anchor	6½	6	7	6½
Elkton Con	65	64⅜	65½	64½	Old Gold	9½	9	9⅛	9
El Paso	91	90½	90⅜	90	Pharmacist	3⅜	...	...	...
Gold Dollar	6⅛	5⅞	...	...	Portland	1.67	1.65	1.67	1.65
Gold Sovereign	6½	6	...	...	Vindicator Con.	70	66	70	65½
Isabella	22	20	21½	20	Work	9⅞	9⅜	9⅛	9⅜

PHILADELPHIA, PA.

Company.	Par val.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L	Aug. 8 H.	Aug. 8 L.	Aug. 9 H.	Aug. 9 L.	Sales.
Cambria Iron	50	...	...	47½	...	...	...	...	...	47¾	...	...	...	106
Cambria Steel	50	20	19⅜	20	19½	19⅜	...	19½	...	19⅜	...	19½	...	295
Int.Smokel'sPwd	100	19	...	19	...	...	...	...	...	...	...	19	...	895
Preferred	100	...	...	...	...	...	...	...	...	...	...	...	...	...
Lehigh C. & N.	50	...	...	78¾	78½	...	...	...	...	...	...	78½	...	131
Mont. Tonopah	1	...	...	250	...	250	...	...	...	...	...	...	...	...
Philadelphia	50	39	38½	38½	38⅜	38⅜	...	38¾	...	38⅜	38½	39	...	890
Preferred	50	...	...	...	...	...	...	...	...	...	...	...	...	...
Tonopah	100	819	800	812	800	806	...	812	800	...	...	...	...	...
Tonopah-Belm.	1	...	...	...	...	73	...	73	...	...	...	...	...	...
United Gas	50	...	...	85¾	85½	86	85¾	86	85½	86¼	85½	86¼	86	1,058
Westmoreland C	50	...	...	...	...	...	...	...	...	78	...	...	...	24

Total sales, 3,399 shares.

STOCK QUOTATIONS

ST. LOUIS, MO.* Aug. 6

Company	Par Val	Bid	Ask	Company	Par Val	Bid	Ask.
Am. Nettie, Colo	$10	$0.15	$0.25	Columbia Lead, Mo	$10	.75	$2.95
Catherine Lead, Mo.	10	1.00	2.00	Con. Coal, Ill.	100	15.00	18.00
Central Coal & C.	100	61.50	62.50	Doe Run Lead, Mo	100	110.00	115.00
Central C. & C., Pf.	100	71.00	72.00	Granite, Bimet Mt	10	.38	.47
Central Lead, Mo.	100	110.00	115.00	St. Joe Lead, Mo	10	14.00	14.75

*By our Special Correspondent.

SALT LAKE CITY.* Aug. 6

Company	Par Val	High	Low	Sales	Company	Par Val	High	Low	Sales
Ajax		5½	4½	5,200	Martha Washing'n		½	9-16	6,000
Butler Liberal	$ 1	9½	9¼	8,700	May Day.	$ ½	½	½	9,900
Carisa	1	7½	7⅛	1,000	Mammoth.	25	1.50	1.25	700
Century.	1	48½	45	700	N.Y.Bonanza	1	4½	1⅛	15,000
Columbus Con		1.03	94	300	Sacramento.	5	10½	10½	6,500
Con. Mercur	5	40	31	2,300	Silver Shield.	1	2½	2½	1,000
Daly.	20	2.52½	2.25	850	Star Con.	1	12½	11⅛	4,100
Daly Judge.	10	4.25	4.00	800	Tetro	1	33	29½	13,800
Daly West.	20	14.50	12.00	867	Uncle Sam, Con	1	19	17½	1,650
Ingot.		¼	⅛	1,000	Victor Con	1	1⅛	1⅛	2,000
Little Chief.	1	1⅛	1½	1,500	Wabash.		1	1	352
So. Mammoth	1	13	12½	1,400	Yankee Con	1	35	30	865

*By our Special Correspondent. Total sales 86,484 shares.

DULUTH, MINN. Aug. 6

Company	Par Val	Bid	Ask	Company	Par Val	Bid	Ask.
Calumet & Arizona	$10	$100.00	$105.00	Lake Sup. & Pitts Dev.	$10	$145.00	$150.00
Calumet & Bisbee	10	3.00	4.50	Pitts. & Duluth Dev	15	33.50	36.00
Calumet & Cochise	10	5.00	5.50	Shakespeare.	10	.....	.20
Calumet & Pittsburg.	10	25.00	28.00	United Mexican	10	.....	.50
Higgins Development.	10	2.00	2.50	Wolverine & Arizona.	10	3.50	....
Junction Development.	15	18.00	21.00	Yaqui.	10	.....	1.00

MONTREAL.* Aug 6

Company	Par Val	High	Low	Sales	Company	Par Val	High	Low	Sales
Dominion Coal	100	47.75	44.75	981	Montreal Steel	100	40.00	35.00	.....
Dom. Coal, Pf.	100	106.25	..	3	Mont'l Steel, Pf	100	100.00	75.00	....
Dom. I. & St.	100	8.87½	8.50	480	Nova Scotia St.	100	58.00	54.00	1.035
Dom. I. & St., Pf	100	24.25	23.00	80	N. S. Steel, Pf.	100	111.75	..	10
Internat'l Coal	100	100.00	..	....	Ogilvie.	100	200.00	180.00	..
Int'l Coal, Pf	100	100.00	..	....	Ogilvie, Pf.	100	125.00	120.00	30

*Montreal Stock Exchange. Total sales. 2,139 shares.

MEXICO.* July 29

Company	Shares Issued	Prices, Mex. Bid.	Ask.	Company	Shares Issued	Prices, Mex. Bid.	Ask.
DURANGO:				San Rafael y An., aviada.	1,200	$700	$720
Ca. Min de Penoles	2,500	$2,700	$3,200	Soledad, aviada.	670	800	850
San Andres de la Sierra	200	10,000	.....	Sorpresa, aviada.	960	285	295
GUANAJUATO:				MEXICO:			
Angustias, Pozos.	2,400	36	40	Alacran.	2,400	20	28
Cinco Senores y An. aviadoras	2,000	35	40	Aldebarren.	2,000	33	35
Cinco, Senores y An. aviada.	400	36	40	Buen Despacho	3,000	58	83
Providencia, San Juan de la Luz.	6,000	50	55	Dos Estrellas	3,000	1,980	2,000
Queensland y Australia.	300	10	15	La Esperanza (El Oro.)	3,000	1,500	1,500
GUERRERO:				La Reformia, aviadores.	2,000	30	36
Delfina, 1st serie	2,500	30	40	Santa Ana, Esperanza.	2,400	60	80
Delfina, 2nd serie.	2,500	25	30	MICHOACAN:			
Garduno y Anexas.	7,200	35	40	Luz de Borda, aviadora	3,000	15	20
HIDALGO:				Luz de Borda, aviado	1,000	8	17
Amistad y Concordia.	9,600	79	80	Santiago y An., Tlal	4,000	7	10
Carmen, aviada.	1,100	85	95	NUEVO LEON:			
Guadalupe Fresnillo Mill	1,000	170	200	La Fraternal	1,000	580	620
Guadalupe Fresnillo Mine	1,400	70	80	Norias de Bajan	1,000	880	920
La Reina y An., aviadora.	5,600	2½	5	SAN LUIS POTOSI:			
Luz de Maravillas, aviadas.	1,100	...	20	Conecpcion y An	3,000	60	65
Maravillas y An., aviador.	1,680	110	150	El Barreno, aviadora.	2,000	78	80
Maravillas el Lobo.	1,000	130	180	Sta. Maria de la Paz	9,600	182	185
Palma y An., aviador	1,800	4	8	San Diegoy Annexas	2,400	6	10
Refugio, aviada.	12,800	680	740	ZACATECAS:			
Santa Anay An., aviadora.	800	50	70	Asturiana y An.	2,500	25	30
Santa Anay An., aviada.	600	25	35	Candelaria y Pinos.	2,500	12	20
Sta. Gertrudis y An aviadas.	9,600	13½	15	Esperanz y An	2,400	6	8
Sta. Gertrudis y An. aviadora	28,800	77	78	Lourdes.	2,500	21	25
Santo Tomas Apostol aviadoras.	5,100	2	3	Luz de Minillas, pagadoras.	2,000	.....	.....
San Felipe de Jesus aviadora.	3,600	16	17	Nueva Quebradilla, aviadoras	2,400	25	40
San Felipe de Jesus aviada	1,200	45	.....	Nueva Quebradilla, aviadas.	600	30	50
San Rafael y An., Tormpillo	1,200	1,810	1,860	San Carlos y Annexas.	2,500	45	50
				Sta. Maria de Gaud.	2,500	100	110
				MISCELLANEOUS			
				Bartolome de Medina.	2,000	97	100
				Naica (Chihuahua)	100	11,000	13,000
				Natividad (Oaxaca) aviadora	1,800	950	1,000
				San Francisco Hac	6,000	81	83
				Union Hacienda.	3,000	290	310

* Figures represent Mexican currency.

LONDON. July 29

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Date.	Quotations. Buyers.	Sellers.
		£. s. d.	s. d.		£. s. d.	£. s. d.
American:						
Alaska-Treadwell.	200,000	5 0 0	2 0	July, 1904	4 10 0	4 15 0
Anaconda.	1,200,000	5 0 0	2 0	May, 1904	3 12 6	3 15 0
Camp Bird	820,000	1 0 0	9	Aug., 1904	1 6 3	1 8 9
Copiapo.	112,500	2 0 0	6 10	May, 1903	12 6	1 2 6
De Lamar	80,000	1 0 0	1 6	May, 1904	11 3	16 3
El Oro	1,080,000	1 0 0	9	July, 1904	1 1 3	1 2 6
Esperanza.	455,000	1 0 0	6	Aug., 1904		
Frontino & Bolivia	128,662	1 0 0	3 0	July, 1901	3 9	8 9
Le Roi.	200,000	5 0 0	5 0	Nov., 1899	12 6	15 0
Le Roi No. 2.	120,000	5 0 0	1 0	June, 1904	12 6	15 0
Palmarejo & Mexico.	445,000	1 0 0	rts.	Apr., 1903	7 6	8 6
Standard.	500,000	4 0	2½	Sept., 1903	2 6	3 6
Stratton Independence.	1,000,007	1 0 0	6	Dec., 1903	2 0	2 6
*St. John del Rey	546,265	1 0 0	6	Dec., 1903	10 0	11 0
Tomboy.	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Ymir	200,000	1 0 0	1 0	Mar., 1902	2 6	5 0
European:						
Linares	15,000	3 0 0	5 0	Apr., 1904	3 0 0	3 10 0
Mason & Barry.	185,172	1 0 0	7 0	May, 1904	2 15 0	3 0 0
Rio Tinto	325,000	5 0 0	37 6	May, 1904	52 17 6	53 2 6
Rio Tinto, preferred	325,000	5 0 0	2 6	May, 1904	6 0 0	6 5 0
Tharsis.	625,000	2 0 0	7 0	May, 1904	4 2 6	4 7 6
West Australian:						
Associated.	495,388	1 0 0	2 6	July, 1904	2 0 0	2 2 6
Cosmopolitan.	400,000	1 0 0	1 0	Apr., 1904	9 3	9 9
Golden Horseshoe	300,000	5 0 0	6 0	Aug., 1904	6 18 9	7 1 3
*Great Boulder	1,750,000	2 0	1 0	June, 1904	1 2 6	1 3 0
Gt. Boulder Persever'ce.	1,400,007	1 0 0	1 3	May, 1904	10 9	11 0
Great Fingall	250,000	1 0 0	7 0	July, 1904	7 11 3	7 13 9
Ivanhoe.	200,000	5 0 0	5 0	July, 1904	7 5 0	7 7 6
Kalgurli.	120,000	1 0 0	2 6	July, 1904	5 6 3	5 8 9
Lake View.	250,000	1 0 0	rts.	Aug., 1902	1 2 6	1 5 0
*Orova-Brownhill	450,000	1 0 0	3 0	June, 1904	3 6 3	3 8 9
Miscellaneous:						
*Brilliant Central	100,000	1 0 0	1 0	July, 1904	2 15 0	3 0 0
Briseis	600,000	1 0 0	.....	.....	7 9	8 3
Broken Hill.	960,000	8 0	1 0	May, 1904	1 19 0	2 0 0
*Mt. Lyell.	275,000	3 0 0	1 3	June, 1904	12 6	13 6
Mt. Morgan.	1,000,000	1 0 0	3	July, 1904	2 5 0	2 7 6
Waihi.	497,412	1 0 0	4 6	June, 1904	5 10 0	5 12 6
Indian:						
Champion Reef	513,832	10 0	1 3	May, 1904	1 11 3	1 12 6
Mysore	566,043	10 0	4 6	July, 1904	6 7 6	6 10 0
Nundydroog.	484,000	10 0	1 3	July, 1904	1 10 0	1 11 3
Ooregum.	343,000	10 0	1 3	Aug., 1904	17 6	18 9
Ooregum, pfd.	240,000	10 0	4	Aug., 1904	1 8 9	1 11 3
South African:						
Angelo.	600,000	1 0 0	7 0	Aug., 1904	6 17 6	7 0 0
Bonanza	200,000	1 0 0	8 0	Aug., 1904	1 5 0	1 7 6
British South Africa	4,436,019	1 0 0	rts.	May, 1899	1 2 6	1 5 0
Cape Copper.	300,000	2 0 0	2 6	July, 1904	3 2 6	3 7 6
Cape Copper, pfd.	75,000	2 0 0	2 6	July, 1904	3 0 0	3 5 0
City & Suburban.	340,000	4 0 0	4 0	Aug., 1904	6 0 0	6 5 0
Consol. Gold-Fields	2,000,000	1 0 0	.....	.....	6 5 0	6 7 6
Crown Reef.	120,000	1 0 0	6 0	Aug., 1904	14 5 0	14 15 0
De Beers, preferred	800,000	2 10 0	10 0	July, 1904	18 11 3	18 8 3
De Beers, deferred.	1,000,000	2 10 0	12 6	July, 1904	18 8 3	18 12 3
East Rand	990,000	1 0 0	5 0	July, 1903	7 10 0	7 11 3
Ferreira.	90,000	1 0 0	22 6	Aug., 1904	20 10 0	21 0 0
Geldenhuis	200,000	1 0 0	7 0	Aug., 1904	5 6 3	5 8 9
Geduld.	400,000	1 0 0	rts.	Mar., 1902	5 12 3	5 18 9
Henry Nourse.	125,000	1 0 0	8 0	Aug., 1904	8 5 0	8 10 0
Jubilee.	50,000	1 0 0	5 0	Aug., 1904	4 5 0	4 15 0
Jumpers.	100,000	1 0 0	2 6	May, 1904	5 12 6	2 17 6
Langlaagte.	470,000	1 0 0	2 0	Aug., 1904	3 11 3	3 11 3
May	288,750	1 0 0	3 0	Aug., 1904	3 17 6	4 0 0
Meyer & Charlton.	100,000	1 0 0	5 0	Aug., 1904	5 3 9	5 12 6
Modderfontein.	290,000	1 0 0	rts.	Apr., 1902	7 18 9	8 1 3
Namaqua.	94,331	2 0 0	3 0	Dec., 1903	2 15 0	3 0 0
*New Jagersfontein.	200,000	5 0 0	10 0	June, 1904	27 5 0	27 15 0
New Primrose.	325,000	1 0 0	3 0	Aug., 1904	3 10 0	3 12 6
Rand	1,795,956	5 0	5 0	Aug., 1902	9 11 3	9 12 3
Robinson.	750,000	5 0 0	6 0	Aug., 1904	9 2 6	9 7 6
Robinson Deep.	950,000	1 0 0	3 0	Aug., 1904	5 2 6	5 5 0
Rose Deep.	425,000	1 0 0	3 0	Aug., 1904	8 7 6	8 12 6
*Salisbury.	100,000	1 0 0	2 0	June, 1904	1 10 0	1 15 0
Village.	400,000	1 0 0	4 0	July, 1904	4 15 0	5 0 0
*Wemmer.	80,000	1 0 0	12 6	July, 1904	10 10 0	11 0 0

*Ex-dividend.

LONDON (By Cable.)*

Company	Aug. 6 £	s.	d.	Aug 9 £	s.	d	Company	Aug. 6 £	s.	d.	Aug. 9 £	s.	d.
Anaconda	..	..	..	..	..	..	Esperanza.	0	19	9	0	19	9
Camp Bird	1	8	3	1	8	6	Modderfontein	8	2	6	8	12	6
Con. Gold Fields	5	16	3	6	1	3	Rand Mines.	9	17	6	9	1	3
Dolores.	1	0	6	1	1	6	Rio Tinto	52	12	6	52	31	3
East Rand	7	12	0	7	18	9	Simmer & Jack	1	10	6	1	12	6
El Oro.	1	3	0	1	2	6	Tomboy.	1	2	6	1	2	6

*Furnished by Wm. P Bonbright & Co., 15 Wall St., New York

PARIS. July 28.

Company.	Location.	Capital Stock.	Par value.	Latest divs.	Prices. Opening	Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal	France.	.....	.....	290.00	5,625.00	5,675.00
Boleo, c	Lower Cal.	12,000,000	500	104.17	1,897.00	1,925.00
Champ d'Or, g	S. Africa	3,375,000	25	3.75	17.50	17.50
Courrieres, Coal	France.	600,000	500	110.00	2,860.00	2,890.00
Fraser River, g.	Brit. Col.	250,000	25	.....	5.50	5.50
Huanchaca, s.	Bolivia.	40,000,000	125	2.50	101.00	98.00
Laurium, z. l	Greece.	16,300,000	500	25.00	300.00	310.00
Malfidano, z.	Italy	12,500,000	500	50.00	589.00	592.00
Metaux. Cie. Fran. de	France.	25,000,000	500	22.50	482.50	481.00
Mokta-el-Hadid, i. l.	Algeria	18,312,000	500	40.00	900.00	907.00
Nickel, n	N. Caledonia	15,000,000	250	22.50	559.50	545.00
Penarroya, Coal	Spain	.....	500	45.00	1,026.00	1,026.00
Vielle Montagne z.	Belgium	9,000,000	30	30.00	715.00	717.00

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.